JOURNAL OF GAS LIGHTING, WATER SUPPLY, &c.

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EDITORIAL NOTES.

Exit the Gas Institute and the Institution.

THE Gas Institute and the Institution last Saturday gave the final vote by which they surrendered their individuality, and passed into that metamorphic state from which they will issue as a combined body, under the title of the Institution of Gas Engineers. The work which has had to be accomplished to bring about this desirable state of things has been tedious, troublesome, and at times dispiriting. But the end crowns the work; and all who have done much or little in forwarding it, can rejoice to-day over the part they have taken. It is indeed a signal victory for perseverance; and while the passing from the old to the new state may mean the shedding of a little of the membership on both sides, the loss will not affect the future. The same perseverance, the same indomitable courage, that has conquered all obstacles to the attainment of the greatest object the gas profession has had before it during the past three years, will not, we feel sure, fail in being equal to the building on the coalition a more elevated reputation for good work for the gas industry than was possible on the old riven foundations of professional organization. We now look forward to a large expansion of useful work—not perhaps immediately, but eventually; to the Institution taking its proper position as a potent centre of industrial as well as educational advancement; and to, consequently, its adequate recognition among the technical and learned societies of the country.

To a large extent the new Institution starts out with, at the helm, men younger than are those now who steered the fortunes of, and held ascendency in, the old organizations a few years ago. But in the counsels of the present leaders the advice of the older and more experienced will always be courted, will not be withheld, and will have valuable weight. Those who are stepping aside have by their work advanced to the present stage the diffusion of technical knowledge in the gas industry; and that work, and the experiences gained in its prosecution, will be as a guide-book to the younger men into whose hands the direction of the new Institution has largely passed. From these men vigorous and fresh developments will be expected; and in their aims and endeavours to increase the usefulness of the combination of the forces of the two old organizations, they will receive the best of encouragement from their predecessors. The change that has been brought about in administrative leadership is not a sudden effect of the passing from division to unity. Its coming has been gradual and natural, and, if anything, is one of the effects of the passing from former unity to division. With the running of two premier organizations, the men who stood, in point of seniority and repute, head and shoulders above their fellows, and who were willing to take upon themselves the duties of the administrative and high offices, were soon exhausted; and this then opened the way for younger engineers who had elbowed themselves, by work and ability, into positions which entitled them to recognition by their fellows. And it is these younger men who will now very largely mould the future of the new organization. Indeed, the honour of being the first President of the Institution has fallen upon Mr. Andrew Dougall, who until last Saturday was the President of the Gas Institute, and now is its Liquidator. The appointment was made by the Council, under Article 35, at their first meeting after the confirmation of the winding-up resolutions on Saturday. We can well understand that the dignity of being first President under the new state is one that many men would covet; but it will be conceded that there are several reasons, which are too obvious to require naming, that entitle Mr. Dougall to the honourable position. The task of floating the Institution will be no light one; but Mr. Dougall has the requisite qualities for the work—particularly, and in good measure, the "*suaviter in modo, fortiter in re.*" We heartily congratulate him upon his appointment, and wish for him the success that will distinguish the few months between now and the close of the first annual general meeting as among the proudest in his career. In the principal offices, Mr. Dougall will have as colleagues Mr. H. E. Jones (the President-Elect of the old Institution), Mr. T. H. Martin, and Mr. D. Irving as Vice-Presidents, Mr. James W. Helps as Hon. Secretary, and Mr. W. T. Dunn as Secretary. The Council is composed of the Councils of the old bodies; and looking down the list of names one sees how largely the last few years have produced a change in the *personnel* of the administrations of our technical organizations.

There is no occasion to say much here regarding Saturday's proceedings. The resolutions confirming the winding-up of both the Institute and the Institution were unanimously passed. It was found that the Board of Trade had called for some further amendments in the Memorandum and the Articles of Association, which amendments are of no importance, excepting to the extent that they assist in the perfecting of the regulations, though, in one or two of the instances a little mystification has been imported into them. But no one will be a jot the better or worse for the enigmatical introductions. Mr. C. E. Jones was inclined to regard the occasion as the death and burial of the Gas Institute; but we think in that he stands alone. It is simply a reversion to the *status quo ante*, with such modifications and improvements as the past has shown to be desirable. The Board of Trade have decreed that abbreviated distinctive titles are not to be permitted the new Institution; the reason being, according to the Solicitor, that distinctive titles of any kind are in future going to be eliminated from Articles of this nature. Very few, we undertake to say, will regret the deletion of the worthless proposal. It is a point for wonder to many that a majority of the thirty members of the Council ever countenanced the suggestion. That indefatigable worker in the cause of amalgamation, Mr. Helps, is to be the Liquidator of the old Institution; and his eminent services, and those of Mr. Dougall in the carrying of the negotiations to a happy issue, were acknowledged at the meetings in appropriate language and with due heartiness. The final words uttered at the members' meetings on Saturday were by Mr. Helps. They reflect the wish that has already been expressed in these columns; and we cordially adopt them. They are, "that the new Institution may "have before it a very large world of usefulness." It has. The development rests with the workers; but it must not be allowed to fall entirely on the few.

The London County Council's Bill to Amend the Gaslight and Coke Company's Acts.

THE Parliamentary Committee of the London County Council have placed upon the *agenda* of the Council for to-day's meeting a report and recommendation relating to the Bill they have prepared to amend the Gaslight and Coke Company's Acts. We give the full text of this important communication in another column. It will be found to make provision (*a*) for a reduction of the Company's initial price from 3s. 9d. to 3s. 3d. per 1000 cubic feet, coupled with a scale of increase or decrease of dividend equivalent to the secondary sliding-scale recommended by Sir James Rankin's Committee of 1899; (*b*) for a reduction of the standard of illuminating power of the Company's gas from 16 to 14 candles, together with a reduction of 1d. per candle in the standard price, which would thus become 3s. 1d. per 1000 cubic feet; and (*c*) for one-half of the Company's clear profits (if any) after paying a dividend of 4 per cent. per annum, to be carried to a fund formed for the redemption of obsolete capital. The Bill will not touch the existing obligation of the Company to charge for gas supplied for public lighting at the South Metropolitan price for the time being. "On "the contrary," says the report, "the reduction of illuminat- "ing power to 14-candle gas should result in a lowering "of the Company's charge for public lighting from 2s. 3d. "to 2s. 1d." It is explained by the Committee that the Bill is the outcome of the conference of Metropolitan Local Authorities interested in the charges of the Company, which

was held in the County Hall last March. Consequently, they hope that it will go forward with the united support of all these bodies, including the Corporation of the City of London; and they are in hopes it will be regarded favourably by the Board of Trade and the Government. It would be premature, as the scheme of the Bill has not yet been approved by the County Council, to offer any comment upon its sufficiently drastic proposals. There will be plenty of occasions for doing this before the fortunes of the measure are settled by the House of Commons. The fact of the Company having given notice of a Bill of their own will, of course, weigh with the Metropolitan Authorities as well as with the Government in any decision they may respectively come to in regard to the legislative resettlement of the affairs of the Company; and this clear evidence of the existence of willingness on the part of the Company to have their powers recast should at least save them from the summary treatment that was meted out to them last time. It will be something gained to get the whole matter referred to a Committee; and it might not be a bad idea for the President of the Board of Trade to take the Chairmanship of the Committee himself.

Professor Lewes's New Course of Cantor Lectures.

It was said the other day, by a prominent politician, that almost the sole remaining asset of a once great political party is a certain popular caricaturist. This was carrying to an extreme the principle that individual men are, after all, the greatest world-powers. We should be sorry to have to say of the gas industry of the United Kingdom that it is a one-man affair; but we are quite certain that if the assets of the industry were to be valued, the personality of Professor Lewes would count for a substantial figure in the great inventory. Remembering the volume and quality of the brilliant contributions to the literature of the industry which stand in the name of Vivian B. Lewes, it seems almost too much to expect that the new series of Cantor Lectures on "The Future of Coal Gas and Allied Illuminants," now being delivered by him (the first of which is reported elsewhere) should contain anything fresh; but those who should think so do not know their Lewes. It is not our present intention to comment upon the first lecture of the series—reserving this pleasure until the whole are before the world. But we mention the lectures in this column in order to bespeak for the lecturer the attention, and if possible the presence, of our gas engineering readers. The office of the lecturer still remains of supreme value for teaching purposes; for the printed page can never, of course, reproduce the emphasis of the spoken word. This first lecture of Professor Lewes's new series is largely historical; but, nevertheless, it is an astonishing example of the author's facility in packing all the preliminary data he requires for his lucubrations into an uncommonly small compass. He has already plunged into the heart of his subject, and placed on record his views regarding the methods of manufacture of the gas-of-all-work for the future. Whether one fully agrees with him or not, Professor Lewes is always worth listening to; and for this reason it is to be trusted that all the rising generation of gas engineers within hail of the Society of Arts will make a point of attending the present course of lectures.

Appeal in the Carbide of Calcium Case Dismissed.

The decision of the Court of Appeal, refusing to alter Mr. Justice Buckley's decision in the infringment action taken by the Acetylene Illuminating Company, Limited, against the United Alkali Company, Limited, appears to throw open the manufacture of calcium carbide. The appellants relied upon Willson's patent, against which the defendants had set up certain alleged anticipations; and in the event the Court held that the anticipation was established. In face of the technical history of calcium carbide, the Court of Appeal agreed with the learned Judge in the Court below that it was not good subject-matter for a patent. Thus probably ends the legal history of the new industry, unless the matter is carried to the House of Lords, as to which there is no information for the present. It would be idle to discuss the case for and against Willson's patent; but it is permissible to remark that if Willson was not the true first inventor of the method of manufacturing calcium carbide now employed, he was, at any rate, first to perceive and develop its possibilities in the service of mankind. We must credit Moissan with the prior discovery of the method of making this compound by means of an electric furnace, although he did not put the process to any practical use. This is not the fault either of science or of its representative in the person of M. Moissan. The worker in pure science tries all manner of methods in order to discover the secrets of Nature, without regard to the commercial value of his results, which he discloses for just what they may be worth. It may, and occasionally does, happen, that the method of the man of science is indistinguishable by the judicial eye from the process of the commercial manufacturer—in which case the latter has no patent. It is proper subject-matter for one, however, if the inventor of a process can show that he has added something to, or intentionally varied from, the disclosed discovery, with the object, successfully attained, of obtaining higher returns or a better product. The Court of Appeal has not found anything like this in Willson's patent specification of 1894, which was in question. Consequently, the action against an alleged infringer of this patent has failed, and been dismissed. What effect this litigation may have on the calcium carbide industry remains to be seen. Generally speaking, the case is instructive as showing how difficult it is at the present day to maintain a "master" patent. More than this, it is difficult to say what the case does mean for the general public. One scarcely knows whether the calcium carbide industry is one with a great future or not. It is a curious point, that an inquiry of Lord Justice Williams as to how acetylene got its name remained unanswered. Nor is it possible, apparently, to find out more on this head than that the name was given to the gas by Berthelot; but how the great French chemist came to think of such a really pretty name for such an unprepossessing compound is purely conjectural.

More Parliamentary Notices for Next Session.

As remarked here last week, the general crop of parliamentary notices of Gas Bills for the coming session is about the usual in number and importance. It is impossible to name them all in these columns; and we must be satisfied with mentioning a few of the promised Bills which appear to offer some specially interesting points. The Birmingham Corporation, of course, are coming to Parliament again for those powers to take a new site for gas-works (with an eye to the comparatively distant future) of which the Gas Committee were disappointed last year, through no fault of their own. No surprise will be caused by the announcement that the Bournemouth Gas and Water Company need further powers, evidently to facilitate the arrangement entered into last year for the concentration of the manufacturing requirements of this rapidly-growing undertaking in the commercial district of Poole. The Corporation of Bradford are taking further steps to complete the "ring-fence" of their gas property, by selling off the Shipley outlying portion to the Local Authority. Bridgwater is in Parliament for the first time since the reign of William the Fourth. It is high time the archaic Act of Incorporation of the Company was adjusted to modern circumstances. Norwich wants further attention from the British Gaslight Company; and it is good news to hear that the business there is in need of additional capital. The Chard Corporation propose to take advantage of the purchase provision inserted in the Company's Act of this year. The Faversham Gas Company are going for capital consolidation, a reduction of the illuminating power, and a General Powers Bill of the latest pattern. The Hampton Court Gas Company are in similar case, and think favourably also of a supplemental electric lighting branch. The Maidstone Gas Company follow the same fashion, and propose to obtain a thoroughly modern Act. Market Drayton is an old-established limited Company, who at length propose to reincorporate under a changed name. The Nantwich District Council desire the undertaking of the local Gas Company. The Winchester Water and Gas Company have a stock-conversion scheme which includes issues of new capital to employees and consumers. The Wellington (Salop) Company contemplate selling any sort of combustible gas, and taking electric lighting powers. This is, indeed, a "sporting" Bill.

A new undertaking altogether appears in the list, by the name of the Billingshurst and District Gas Company, which is for the supply of one of those rapidly-growing residential neighbourhoods, really suburbs of the Metropolis, that have

sprung up of late years in favourite parts of the Home Counties. The Derby Gas Company are asking for stock consolidation, reduction of illuminating power, and other improved working conditions. The Ipswich Gas Company are also proposing the inclusion of employees and consumers in their proprietary. A specially interesting Bill should be that for transferring the Walker and Wallsend Gas Company's electricity supply undertaking to the Newcastle-on-Tyne Electric Supply Company, Limited. After all that has been stated concerning this business, the proposal is distinctly one to arrest attention and arouse speculation. A "Power Gas" Company is to be promoted, with large proposals, for a great area of the north-western counties. The Plymouth and Stonehouse Gas Company seek certain improved facilities, including the reduction of illuminating power. There will, of course, be many occasions for discussing the salient provisions of all these measures when their exact terms are known; but enough appears on the surface, both of these parliamentary notices and of those we mentioned last week, to show the intensity and wide range of the activity that now permeates through and through the English gas industry.

In this connection, the notices of applications for Provisional Orders to the Board of Trade and the Local Government Board also call for mention. They demonstrate both the popularity of this method of procedure for obtaining ordinary statutory facilities for carrying on gas undertakings, and also the propensity of applicants to test its capacity to the very utmost. Thus the Cobham Gas Company, by their Order (like the New Hunstanton Urban District Council, by their Bill) seek to have it enacted that the Company are not to be deemed to have received payment for gas consumed by a slot meter until the money has been actually taken possession of by their collector. Opinions will differ as to the expediency of such proposals under any conditions; but if it is a question of altering the law of the land by Provisional Order, the objections that could be raised are both obvious and grave. Three applications are from Ireland—Strabane, Tipperary. and Wexford. The Glasgow Corporation have further business with the Secretary for Scotland; but besides this there is not a Scotch Gas Bill or Order for the session. This observation does not lend much support to the political plea occasionally heard, for "gas-and water "Home Rule all round." There would be very little play in respect to Gas Acts for the delegated powers which the Imperial Parliament could spare with a view to setting up subsidiary legislatures in business.

Taxation and Trade.

All taxpayers, and not least the proprietors of the large trading concerns upon whom a fifteenpenny income-tax presses with much severity, will have read with great satisfaction that part of the Chancellor of the Exchequer's speech at Croydon last week in which he foreshadowed some remission of the present heavy rates of taxation which the war in South Africa has rendered necessary. But it must be remarked that, if Mr. Ritchie is basing his expectations largely upon what he was pleased to describe as the "fact" that trade is recovering from its decline, and is now on the upward grade, the promised reductions in taxation may not prove so substantial next April as he anticipates. We really do not know upon what grounds the Treasury officials whose business it is to advise the Chancellor of the Exchequer in regard to trade prospects, base their opinion that trade is on the upward grade. Certainly it cannot be upon the state of the labour market, as to which it will have been noted as a significant sign that, after an absence of some years, the question of the "unemployed" has reappeared in Parliament. Last Wednesday, Mr. John Burns asked the President of the Local Government Board whether, "having "regard to the scarcity of employment which now exists in "many parts of the country," he would consider the advisability of issuing a circular to local authorities, similar to those issued by the Local Government Board in 1893 and 1895, urging the authorities to carry out such improvement works as could be undertaken by those in need of employment.

Mr. Long was "not in a position to say that it was ex-"pedient to issue a circular of the kind suggested at the "present moment;" but it was not denied that the official returns show that the percentage of unemployed members of Trade Unions is now heavier than it has been since trade recovered from the depression of 1894-6. This is hardly consistent with the Chancellor's optimistic opinion; nor can we find any evidence in its favour upon considering the special reports of the various trade organs. Many of the men in employment are not working full time; while overtime, which was so general about two years ago, is now the exception. Glancing through that valuable column in "The Times," headed "Metals, Freights, and Shipping," to which all business men who desire to be *au fait* turn every Monday morning, we make the following notes, which hardly point to an upward tendency.

Trade, as seen from Birmingham, is very languid, except where special circumstances impart activity. In a large number of factories, the working hours have been curtailed to keep production in strict correspondence with demand. All manufacturers appear anxious not to increase their stocks, owing to the uncertainty of the outlook. At Glasgow, a fair volume of business is still passing; but the scarcity of fresh inquiries is unsatisfactory, and there is comparatively little new work to take the place of the contracts running out. Ironmakers state that there is no improvement, and that the competition from the Continent continues very keen. From Newcastle, there is a similar report of foreign competition in iron and steel; while in the shipbuilding trade matters are dull—the launches exceeding the few stray orders induced by the reduction in wages. In Sheffield, the only heavy departments of the iron and steel trades that are at present fully employed are those engaged on Government work. Manufacturers are not buying fuel heavily; so that the common classes of manufacturing fuel are difficult to dispose of. Wolverhampton sees old orders running out and not repeated for like quantities. The iron trade there does not show any favourable movement, and in some instances the demand is slower. From Shropshire, the report is that trade is easier, as foreign competition is becoming very keen.

We do not think that, before going to Croydon last Wednesday, Mr. Ritchie can have looked at "The Times" for the preceding Monday, or he would hardly, in face of the reports from which we made the foregoing memoranda, have spoken of an upward movement in trade. Probably he has attached too much importance to the fact that, in consequence of the flourishing state of business in America, and the strikes there and in France, our shipments of iron and coal have recently been very heavy. But what we are concerned with is the necessity of keeping before our readers the fact that the fillip so given to the raw iron and the coal trades is one that will not last, so far as it is possible to foresee, beyond this winter at the most; that all other conditions (with the ever-necessary exception of labour difficulties) are in favour of an easier market for coal next spring; and that it is therefore desirable that buyers should avoid committing themselves for long distances ahead. So many people are likely to take the Chancellor of the Exchequer's dictum for "gospel," that we have thought it well to emphasize our belief that there is no foundation for it in fact.

A Strike Leader Imprisoned for Assault.

Another discouragement for militant Trade Unionists was provided by Mr. Justice Bucknill at Swansea Assizes this day week, when his Lordship sentenced John Keefe, Chairman of the Mond Nickel Works Strike Committee, to twelve months' imprisonment with hard labour for murderously assaulting a "blackleg." Well may the Trade Union leaders bewail the hardship of having to bend their necks to the yoke of "judge-made law," especially when the judges have Welsh business to dispose of. Taff Vale began it; and the lawsuit which originated there went so very disastrously against Union cash-boxes. Now Swansea has borne home to them the sorely-needed lesson that the striker, in the industrial sense of the word, who so far forgets himself as to strike another, in the ordinary meaning of the term, can be punished just like any other ruffian. Men who have allowed themselves to become saturated with Trade Union delusions will require some time for awaking to the stern realities of the law. They flattered themselves for years that Unions were above every law, until they were told the contrary; and then they had the impudence to ask that the law should be altered to fit their conception of it. They have also always cherished the illusion that men on strike have rights, as against those who take their places, which they may enforce by violence. This is really the source of those tumults and outrages from which scarcely

any serious strike is free. Men who throw down their tools, as a means of bringing a dispute with their employers to a head, never think that when they are paid what is due to them their connection with their old employment is ended. They still regard themselves as "the men" belonging to the employment; and in this mental attitude, as somebody has well pointed out, they are encouraged by thoughtless outsiders, including the newspapers. Consequently, when they see others occupying their places, they are easily able to persuade themselves that these successors are interlopers, if not actually trespassers upon their preserves. Mr. Justice Bucknill swept all this nonsense away from the Swansea case. The prisoner, he said, was absolutely free to refuse to work if he liked; but he must not say that another man should not do the work he refused to do. "The idea that "these other workmen were taking the bread out of the "mouths of the strikers was the biggest fallacy in the "world." Yet the whole fabric of Trade Unionism rests in fact upon nothing else. The typical Trade Unionist is far indeed from intending to commit an act of renunciation when he goes out on strike. The efficacy of the action rests upon intimidation, no less. His employer is intimidated, first, by the probable loss of profit, and to this is added, whenever possible, the power of obloquy. This is the famous Bethesda prescription. If the first part of the treatment fails of its intended effect, so that the employer takes it fighting instead of lying down, then the intimidation is extended to the fresh workpeople. Upon this simple scheme of operations every militant Trade Union relies, has always relied, and must go on relying if it is to continue in existence. Mr. Justice Bucknill's sentence upon Keefe will not tend to make it easier to organize strikes in the future.

The Granton Gas-Works.

It will be of interest to engineering readers to learn that arrangements have been completed for the publication in the "JOURNAL," week by week during the first months of next year, of a series of articles describing the new works which have been constructed at Granton, for the Edinburgh and Leith Gas Commissioners, under the engineership of Mr. W. R. Herring. The descriptive matter will be accompanied by a large number of drawings specially prepared, by the kindness of Mr. Herring, for the purpose, as well as by several photographic illustrations. These will form a feature of the next volume, and we trust will be useful as an exposition of one of the latest examples of complete new gas-works construction on the large scale. The work of preparation has been occupying Mr. Herring during part of his little leisure time for some months past; and we are certain the publication will be highly appreciated. It is his intention to subsequently rewrite the matter (giving more detail, and his reasons for adopting certain methods of construction and forms of plant), and then publish the whole in book form, with some additional illustrations.

The Capping of Gas Service-Pipes.

The inquest on the bodies of the two unfortunate victims of the gas poisoning case at Heywood, revealed a practice on the part of the Corporation, who are the owners of the gas undertaking, which is susceptible of improvement. The evidence of the man Taylor, whose wife and adopted son were asphyxiated, made it abundantly clear how the accident happened, and that it was the result of the grossest possible carelessness on his part. Taylor had two meters fixed in his house—one for lighting and one for heating purposes—but subsequently his wife gave notice of their intention to discontinue the use of gas for lighting. The Inspector thereupon uncoupled this meter, and screwed a cap on the main pipe in the usual way. The meter was then allowed to remain in its place; and as everything was believed to be satisfactory, no further attention was paid to it until after the accident. In reply to the Coroner, the Inspector said that when the gas was cut off from a house in this manner, he did not, unless he was specially ordered, go to see whether anybody had coupled up the meter and was using the gas. Apparently the Heywood Corporation treat their customers in a more trustful manner than some people consider wise; but though this may be quite proper when it is only the loss of a few shillings that may be involved, the matter assumes an altogether different aspect when the chance, however remote, of the sacrifice of human lives arises. To leave the meter in position and merely screw a cap on the main, makes it easy for an ignorant man to couple up his supply, and uncouple it again, at his pleasure. This is what happened at Heywood. Something having gone wrong with a lamp, Taylor promptly connected up his meter, and took a supply of gas. The pipes being leaky in the house, he disconnected the supply again on retiring to bed. On the night of the accident, he disconnected the meter, but must have forgotten to turn off the main tap. The gas therefore poured straight into the house, with the fatal results recorded. No suggestion of fraud was made against the man, as the gas he used was registered by the meter; the case was one of ignorance and carelessness—a combination which is found with sufficient frequency to render it advisable to take all practicable precautions against ill-effects arising therefrom. With this object in view, the Jury desired the Coroner to add to the verdict of "Accidental death" a recommendation that for the future when the Corporation disconnect meters they should seal the cap in some way, so as to ensure it against being tampered with. This is a good suggestion; for, as the Coroner remarked, many people would scruple before they broke a seal, though it might be an easy matter to do so if they were determined. Seeing the great danger arising from amateur gas-fitting, it should be rendered as difficult as possible for people to act in the manner in which the foolish man Taylor did. No doubt the Heywood Corporation, and other gas suppliers who may find it inexpedient to remove the meters altogether on receipt of an intimation that no further gas is required, will pay heed to the recommendation of the Jury, as well as make arrangements for the periodically inspection of the indices of all meters, whether supposed to be in use or not.

The Testing of Gas on Sundays.

It would be a pity if a few remarks made by Sir George Livesey at the welcoming-home dinner of the reservists of the South Metropolitan and Crystal Palace Gas Companies last Wednesday were not brought to the notice of the members of the London County Council through insufficient prominence being given to them. The men had presented to Sir George an address; and it was in his acknowledgment that he remarked: "Some very unkind things are said about gas people. It was stated in the London County Council last week that, 'if it is known that the gas of the London Gas Companies is not tested on Sundays, that day will become a royal day for cheating.' I may say that never has gas been tested on Sundays; and I can also say that I care nothing for such a charge from that quarter. But what I do care about, and what I am prepared to be judged by, is the opinion of those whom we serve and who know us best. If the consumers of gas of both Companies can (and I know they can do no other) bear testimony that they have been served honestly and fairly, and if the employees of the Companies can say we have tried to do justice to them, and have treated them fairly and kindly, they are the judges to whom we appeal, and by whom we are content to be judged. I accept this address for myself and my colleagues as a further proof that, in the opinion of our workmen, we have acted fairly and considerately towards them." The quoted remark made at the London County Council meeting was not at the time contradicted nor repudiated. The man who uttered them evidently does not know the Chairman of the South Metropolitan Gas Company. If he made his acquaintance, he might be disposed to retract his ill-conceived and ignorant observation.

A Curious Audit.

The audit of the Sowerby Bridge District Council accounts by the Local Government Board Auditor recently, forms amusing reading, the fun having been caused by a Mr. J. W. Lodge, who, we are pleased to notice, is an ex-member of the Council. This gentleman found fault with everything, not refusing even to notice a charge of 6d. for a penholder for the Surveyor's office. It was in vain that the Auditor pointed out he was not there to deal with the manner in which the Council conducted their business—the objector was irrepressible. He challenged item after item, until at last the Auditor was moved to remark that if they went into such general matters they would be there for hours. "But," retorted Mr. Lodge, "you are paid for it. I am prepared to give my time for nothing." Which showed that, however much at sea

this gentleman was in regard to some matters, he found no difficulty in appraising the value of his own time. Later on objection was taken to the "Local Government Journal," the "JOURNAL," &c., being subscribed for on behalf of the respective departments of the Council. But on this point the Auditor ruled that the Council were justified in purchasing these periodicals, if they thought they would add to the efficiency of the officials. This, however, was not sufficient to silence Mr. Lodge, who went on to propose that, after perusing the papers, the officials might loan them to the public library for a week before filing them. The Auditor, in his surprise at this novel idea, gave voice to the following question: "You do not suggest that they are going to keep papers after all the people there have thumbed them?" This, of course, was precisely what Mr. Lodge had suggested; but perhaps second thoughts were the best—at any rate, he vouchsafed no answer. One would have thought that this would have been enough; but our objector's motto must be "Never say die"—for he forthwith proceeded to challenge a payment of 3s. for the cremation of some diseased pigs, which had been condemned by the Magistrates and burnt at the gas-works. The employees who took on the unsavoury job of cutting up the carcases and putting them into the fire do not appear to have been overpaid; but Mr. Lodge's view was that the owner of the pigs should have found the money. However, as the Council had never been able to discover who was the owner, there was about as much in this objection as in some of the others. This sort of thing went on, until at last the Auditor was obliged to limit this talkative ratepayer to "another twenty-five minutes," on which Mr. Lodge proposed that, if he was finished before this time, he should toss the Auditor for drinks. We had begun by regarding these incidents as amusing; but now that the "Note" is finished, we feel that this is not at all the right sort of description to apply to them, seeing that the occasion was one which should have been devoted to the discussion of serious business matters.

Power-Gas Corporation, Limited.

Bearing in mind the great amount of discussion which took place, in the Press and elsewhere, a year and more ago, with regard to the proposals of the Power-Gas Corporation, Limited, we have no doubt our readers will be greatly interested in the report of the first year's working, which was issued last week. The Directors commence with the very satisfactory statement—at any rate from the Corporation's point of view—that the whole of the share capital offered for subscription was applied for and duly allotted; and they were authorized to commence business in the middle of August last year. The purchase of the whole of the properties scheduled in the prospectus (including the entire share capital of Messrs. Ashmore, Benson, Pease, and Co., Limited, of Stockton-on-Tees, where the manufacturing business of the Corporation is carried on) has been completed; and the extension and remodelling of the works was taken in hand at once. Besides the plant for the South Staffordshire Mond Gas Company, contracts for a large number of important installations have been secured; and the Directors state that the works are fully employed. There is a balance to the credit of profit and loss account of £14,967. Of this, it is proposed to devote £2000 to the writing off of the preliminary expenses account, which amounts to £8381; a dividend of 6 per cent. per annum less income-tax upon the ordinary shares, will absorb £8868; one of 4 per cent. on the deferred shares, £2691; and there will be £1408 to be carried forward. The Auditors state in their certificate that "the property account of the Company appears in the balance-sheet at cost price without depreciation;" and that "a proportion, approved by the Directors, of estimated profit on contracts in course of execution has been included in the profits." Subject, of course, to the "estimated profit on contracts" being duly realized, the report cannot be considered an unsatisfactory one.

WATER AFFAIRS.

Impending and Prospective Legislation.

THE circumstances under which we publish to-day the customary abstracts of the "Gazette" notices for the Bills and Provisional Orders for next year are somewhat remarkable, if not absolutely unprecedented. Great pressure of public business has necessitated an autumn session, with the result that while Parliament is still engaged in the consideration of a measure of the highest national importance, its officers and the small army of Agents and others who are concerned with Private Bills are busily occupied in preparing for the session of 1903. The chief fact, however, which makes the present situation unique is the existence in the incomplete programme of the Government of a Bill dealing with the formidable question of the Metropolitan Water Supply, which must either be passed this session or, unless some unusual course is pursued in regard to it, go over till 1904. Partaking, as it does, of the nature of a Private Bill, it must be duly "noticed" in the "Gazette" during November; and this, of course, cannot now be done. Rumours were current last week that a compromise would be effected by dividing the Bill, and securing the passing of the portion subject to the Standing Orders—that containing the purchase clauses—allowing the other to remain in abeyance. But nothing definite was known at the close. It was believed, however, that the Government were confident of their ability to pass the measure in its entirety before the rising of the House on the 20th inst. for the Christmas holidays. Meanwhile, the Bill stands with a portion of its first clause approved, but with a score of pages of amendments prepared for the rest; and at the half-yearly meeting of the Lambeth Water Company a few days ago, Viscount Hampden, the Chairman, expressed the hope—speaking as a water consumer and a ratepayer—that, even at the last moment, the Government would avoid establishing such a Board as the one they propose to constitute.

That the Bill will eventually pass is, however, believed—at all events in Kent; for one of the most important of the notices given for measures dealing with the supply of water emanates from certain Local Authorities in that county, who will apply for the transfer to a Water Board, to be constituted for various urban and rural districts, the portions of the undertakings of the Kent and Lambeth Water Companies situated in Kent, and for the insertion in the London Water Bill of a clause authorizing the Board to be incorporated thereunder to concur in the transfer. In this case, as in that of the larger measure, possession of the undertakings will be desired on an "appointed day," before the ascertainment of the purchase-money; but provision will be made for the payment of interest, as well as of moneys on account. The area over which the proposed Board will have jurisdiction embraces the urban districts of Beckenham, Bexley, Bromley, Chislehurst, Dartford, Erith, Foots Cray, and Penge, and the rural districts of Bromley, Dartford, and Sevenoaks; and these places will be supplied with water from the wells of the Kent Company, which it is proposed to soften, so that it may be delivered "in a better condition" than it is at present, if that is possible. There has been a gradually growing feeling that Kent water should be conserved for the inhabitants of the county; and the proposed Bill is an embodiment of the idea.

The abstracts of the notices which appear elsewhere give an indication of the general nature of the projects in regard to the supply of water which will occupy the attention of the Legislature next year; and additional particulars will be furnished when prints of the Bills are obtainable. New undertakings are proposed for Bolsover, Rodbourne Cheney (Wilts.), and a group of places in West Sussex. The Bath Corporation are desirous of acquiring certain local private undertakings, so as to incorporate them with their own; and the Harrogate Corporation will endeavour to get possession of the Knaresborough works. Oldham is anxious to purchase from the Deanhead Commissioners the reservoir of that name, and the works and lands connected therewith; and Sheffield wishes for an alteration of the scheme of the Derwent Valley Water Board, and also to be empowered to employ any surplus water revenues for the "improvement of the city and the well-being of the inhabi-"tants." A Water Board is to be constituted for Irvine; but the Joint Water Committee of the Leigh and Hindley Local Boards is to be dissolved, and the water-works now under the dual control are to be managed by the two bodies separately, in accordance with an award made by Mr. Joseph Parry, Water Engineer to the Corporation of Liverpool, from which city they will probably be supplied with water in bulk. There will be a fairly large number of extensions, both of works and area, proposed next session; and, as a necessary consequence, additional capital will be required. Some of the powers needed will, as in previous sessions, be sought by Provisional Orders.

AMALGAMATION SEALED.

WINDING-UP THE GAS INSTITUTE AND THE INSTITUTION.

A Few Modifications in the Memorandum and Articles of Association.
The Board of Trade Refuse to Grant Distinctive Titles.
Confirmation of the Winding-Up Resolutions and the Appointment of Liquidators.
First Council Meeting of New Institution—Election of Office-Bearers.

The last acts in the proceedings necessary to the winding-up of the Gas Institute and the Institution of Gas Engineers were enacted in the hall of the Society of Arts last Saturday. To a large extent the business was of formal nature; but nevertheless the meetings have an importance and historical interest in that they set the seal on the era of separation in the associated technical work of the gas industry, and open a new, and it is hoped permanent, period of consolidated effort and oneness of purpose. Everything was practically settled at the meetings of the two bodies on Nov. 1; and the formality of the present occasion only brought to London just about the statutory requirement in point of numbers for the transaction of the special business. The members of the Gas Institute occupied the hall first; the time of meeting being noon.

When the President (Mr. Andrew Dougall) ascended the platform, accompanied by several members of his Council, he only counted the exact numerical attendance necessary to enable him to proceed; but a few late comers swelled the number shortly after. One of the first announcements showed that, in the interval between the two meetings, there had been some comparatively insignificant alterations in the new Memorandum and Articles of Association; but there was no need to do anything more than call attention to them, seeing that the Articles were duly passed at the meetings on the 1st ult. "subject to such alterations (if any) as may be approved by the Council." The Board of Trade had insisted on some trifling alterations, the reason for which, in certain cases, is a mystery to ordinary mortals, and in one or two instances the phrasing is of such a kind that the Solicitor (Mr. H. A. Hood) humorously disowns all responsibility for it. In two or three other respects, the Solicitor has ironed out to the satisfaction of the Joint Council a little roughness in composition to prevent misunderstanding, and in other cases made slight insertions so as to bring about uniformity. All of which, when explained to the members present, did not raise a word of comment. The principal alteration will be found in the much-debated clause 4; and it will be seen that those who desired, with the change from separation to combination, to possess the doubtful honour of appending abbreviated titles to their names, are, by the ruthless exercise of the Board of Trade pen, not to enjoy the privilege. The resolution for the winding up of the Gas Institute was favourably and unanimously voted upon; and the President was subsequently appointed Liquidator for the purpose of giving effect to it.

The Institution meeting was necessarily almost a counterpart of the Institute meeting—both in numbers present and character of proceedings. The President (Mr. Thomas Holgate) was in the chair; and he was supported, among others, by Mr. James W. Helps, who, with Mr. Dougall (who was present at this meeting as a member), has valorously borne the larger part of, and stuck tenaciously to, the work connected with the negotiations during the most critical period of their passage. The winding up of the Institution was also confirmed; and Mr. Helps was appointed Liquidator. At both meetings something was said as to the past work of the two bodies now undergoing dissolution; good wishes were expressed for the future; and Mr. Helps, Mr. Dougall, and the Joint Councils (to-day one) were thanked for their successful labours in producing the happy ending, and the opening of a new state for the gas profession.

Directly after the ordinary members had dispersed, the work of the new Institution commenced, by the Council—the amalgamation of the Councils of the two old bodies—meeting for the election of the chief officials and shaping their future proceedings. As members who have studied the Articles are aware, Article 35 (probably 36 in members' copies) provides that, at their first meeting, the Council shall from their number choose a President, three Vice-Presidents, and an Hon. Secretary. This was therefore the first business; and the Council proceeded to base their selections on the fact that certain members held similar offices in the old societies. The result was that the following elections were duly made:—

President—Mr. Andrew Dougall, of Tunbridge Wells.
Vice-Presidents—Mr. H. E. Jones, of London; Mr. T. H. Martin, New Barnet; and Mr. D. Irving, of Bristol.
Hon. Secretary—Mr. James W. Helps, of Croydon.
Secretary—Mr. Walter T. Dunn.

To all these gentlemen, the heartiest congratulations are offered; and the appointments, we are confident, will be eminently popular throughout the country. With regard to the appointment of Mr. Dunn as Secretary, we understand that, at the respective Council meetings of the two old Societies, resolutions had been passed providing for the payment of compensation to the Secretary who would lose his office. This was necessary as the new Institution would have had no power to grant compensation under this head. The resolution passed by the old Institution of Gas Engineers, in the case of Mr. Cole, was that he should be granted £250; and this was approved on Saturday by the Council of the new Institution. This must be regarded as very generous treatment.

Among sundry matters dealt with by the Council was the appointment of a Sub-Committee to deal with applications, in their initial stage, &c.; and, in this connection, we may emphasize the importance of returning Forms A (which have already been sent out) not later than Dec. 12. Anyone, be it noted, who does not comply with this requirement will have to come up for election (if he desires to join the new Institution) in the usual way, with payment of entrance fee.

It may further be mentioned that the headquarters of the Institution will be at 39, Victoria Street, S.W. (the offices of the Gas Institute). Within three months, the members will be summoned to the statutory meeting; and this will be the first gathering under the new order of things.

The Institute Meeting.

The Meeting of the Institute was held at noon—the PRESIDENT (Mr. Andrew Dougall, of Tunbridge Wells) in the chair.

The SECRETARY (Mr. Walter T. Dunn) having read the notice convening the meeting,

The PRESIDENT said he was sorry the meeting was so small; but he did not think that fact need give rise to any anxiety. It reminded him of a shareholders' meeting of a very prosperous gas company, paying full dividends and making a good bonus. Under such circumstances, some of them knew how very difficult it was to get a quorum; and they had to go out and appeal to the shareholders to come in before they could begin their business. On this occasion, the absence of the members simply meant that they were quite in accord with what the Council had arranged. The Board of Trade had granted the Licence to the new Institution; but, as Mr. Helps and he (the President) could testify, it had not been an easy matter to get them to agree to it. They were very much indebted to the tact and skilfulness of their Solicitor in disposing of points that had cropped up, and so enabled them to get the matter through. Several alterations and additions had been made to the Memorandum and Articles of Association; and, if the members would refer to their copies, he would go through and explain the new points. There was nothing in them of vital importance; but it was necessary he should explain what alterations had been made since their last meeting. In the Memorandum, in clause No. 3, sub-section (*a*), "such of" had been inserted in place of "all," and a few words had been added at the end. The sub-section now read—

(*a*) To acquire and take over *such of* the property and assets of the Incorporated Gas Institute and the Incorporated Institution of Gas Engineers, *as may legally be vested in the Institution*.

Then, going on to sub-section (*i*), it seemed that the Board of Trade would not allow them to confer honours upon themselves. The Board would not have the distinctive titles that were proposed, so they required them to put in the last sentence [the words in italics]—

Provided that *the Institution shall not grant diplomas or titles, and that* every certificate of competence or distinction contains a note to the effect that it is the result of an examination held on behalf of the Institution, and has no statutory effect.

So that the Board would not agree to them having the diplomas and titles. Then, in sub-section (*n*), an alteration had been made; and it now read as follows:—

(*n*) To undertake and execute any trusts which may seem to the Institution conducive to any of its objects, *subject, in the case of any property subject to the jurisdiction of the Charity Commissioners, to the provision affecting the same hereafter contained*.

That was simply an alteration of wording. Coming next to sub-section (*u*), it would be remembered that the Board of Trade inserted a long clause there. They now wanted a little bit more put in. The first sentence would now read—

To do all such other lawful things as may from time to time be incidental to, or conducive to, the attainment of the above objects or any of them, *provided that the Institution shall not impose on its members, or support any regulation which, if an object of the Institution, would make it a Trade Union. And*—

This had been agreed to. Then came the memorable clause 4, about which so much had been said. This had been re-written somewhat. If they had adhered to the clause drawn up by the Counsel to the Board of Trade, they would have had great trouble; but their own Solicitor had been able to meet the case by having it re-written without altering its meaning very much, and this had satisfied the Board of Trade. It now read—

4. No person who, in the opinion of the Council, is actively engaged in or about the management or business, either as principal, managing director, manager, agent, or traveller of any trading company, joint-stock company, firm, or concern doing business with gas undertakings, whether as vendor or as purchaser, *shall be qualified to become a member of any class of the Institution, except an honorary member thereof, as defined in article 9 of the original Articles of the Institution, and duly elected as hereinafter mentioned in the article.*

This amounted to practically the same thing. Then, in the second sentence of section 5, a few words [italicized] had been inserted—

Provided that, *subject to the provisions contained in paragraph 6 hereof*, nothing herein contained—

In section 9, which referred to the winding up, additional words [italicized] had also been inserted—

If upon the winding-up, or dissolution of, the Institution, there remain, after the satisfaction of all its debts and liabilities, any property whatsoever, the same shall not be paid to, or distributed among, the members of the Institution, but, *if and so far as effect can be given to the next provision*, shall be given or transferred to some other Institution or Society not established for purposes of gain, to be determined by a general meeting of the Institution at or before the time of its dissolution, or, in default thereof, by such Judge of the High Court of Justice as may have or acquire jurisdiction in the matter, *and, if so far as effect cannot be given to such provision, then to some charitable object.*

That was simply to get rid of the money in the event of winding up or dissolution; and this, he thought, the members would approve of. In clause 10, there was a big alteration, which he would have to read. It formerly read as follows:—

For the purposes of clauses 5 to 9 inclusive of this Memorandum, the word member shall include a member, associate member, and associate of the Institution.

That was how the clause read when the Memorandum was presented to the members on the last occasion. Now the clause would read—

10. And inasmuch as by the original Articles filed with this Memorandum, the members of the Institution are divided into different classes, and in such Articles only one of such classes is called by the name "member" without any addition to the title, now, to prevent mistake, it is declared that this shall not affect the construction of the word "member" in the eighth clause of this Memorandum, and that the word "member" in the eighth clause of this Memorandum is to have the meaning of the word "member" in sub-section 4 of section 9 of the Companies Act of 1862, so as to comply with the provisions thereof, and the word "member" in clauses 5, 7, and 9 of this Memorandum shall include the persons within the meaning of the word "member" in such sub-section 4 of section 9 of the Companies Act, 1862.

He (the President) hoped the members would understand that. (Laughter.) The Solicitor, he believed, would like it to be quite clear that this was not his composition. They now came to the Articles of Association; and to Article 8 a few words were added at the end. It now read—

8. Honorary members shall be persons elected under Article 4, sub-section 2, and other persons eminent for science, combined with experience in pursuits connected with the gas industry, *and duly elected as hereinafter provided.*

Then going on to Article 30, which dealt with expulsion, as the article was presented before, only full members were allowed to vote in such cases; but, inasmuch as associate members had the power of voting on other matters, it was considered only right they should also vote on cases of expulsion. There might be instances in which an associate member might be concerned; and it would be a great pity that those of his own class should not be allowed to vote. He (the President) did not think the members would require him to read through the section. The only alteration was that the words "associate members" had been inserted where needed. With regard to the section (35) dealing with the election of officers, there was a small insertion—

The first Council shall be constituted as follows: All the 30 members of the Councils of the Gas Institute and the Institution of Gas Engineers who are named in Appendix G, *and consent to act*, shall——[The italicized words have been added.]

At the end of Article 40, dealing with the nomination of the Council, these words had been added—

The provisions of this article shall apply to the election of ordinary members of Council in lieu of those whose offices will be vacant and auditors at the annual general meeting in the year 1904.

There was nothing more until they came to Article 50, sub-section (*k*). After the words "certificates" and before the word "distinctions," the words "and subject to the provisions of the Memorandum" had been inserted; and at the end of the sub-section, the words had been added—

Provided that, without a special resolution, no bye-law, rule, or regulation, shall be made which would amount to such an addition to, or alteration of, the Articles as could only legally be made by special resolution.

That was only right. Then in the sub-section referring to the acceptance of property for, or on behalf of, the Institution, the words, "or any other person or body" had been put in, because no provision had been made for accepting property, donations, or subscriptions from individuals. Then the Board of Trade required that the Institution should hold the statutory meeting within three months of the date when the Licence was granted; so that Article 61 had been altered as follows.

The first general meeting of the Institution shall be held *within three months after the registration of the Memorandum of Association, and the next* at such time during the months of May or June, 1903, ————

Then in Article 67 a few words [italicized] had been included—

67. At every general meeting (without prejudice to Article 30), *and except in the case in which by such article a quorum of* 50 *is required*, 15 members or associate members shall constitute a quorum——

These were all the alterations that had been made since the Memorandum and Articles of Association were presented to the members before; and they had been accepted by the Board of Trade. It was only necessary now for him to move the confirmation, as a special resolution—

That the Gas Institute be wound up voluntarily.

Mr. T. H. MARTIN (Barnet) seconded the motion; and it was at once unanimously carried amid applause.

On the proposition of Mr. MARTIN, seconded by Mr. T. BOWER (West Hartlepool), Mr. Andrew Dougall was unanimously appointed Liquidator for the winding up of the Institute.

The PRESIDENT said he would be very pleased to do what he could in the matter of the liquidation. No doubt, it would involve some work; but he would, to the best of his power, put himself at their disposal to effect its accomplishment.

THANKS AND VALEDICTION.

Mr. C. E. JONES (Leyton) asked to be permitted to move a vote of thanks to the President on this memorable occasion. He was sure this business had been a very harassing one, and for two years had called for the most exemplary patience on the part of the Council and their advisers. They had, it seemed, at last got through; but, with the exception of the Solicitor and those who had had a legal education, he (Mr. Jones) did not think they knew exactly where they were now. He, for one, should wait until he saw the full articles before he professed to understand them at all. (Laughter.) In bidding farewell to the Gas Institute, he must say that personally he very much regretted its decease; and he had hoped it would have been possible to maintain and ensure the succession of title by using the old name. But this, he supposed, was impossible; and the majority had decided that they should have another name. He hoped they would bear with him for a moment. Like Marc Antony, he said: "My heart is in the coffin there with Cæsar." His sympathies were with the old society. *Requiescat in pace.* Now that it was dead and buried, perhaps he might be allowed to remark (as one who had some interest in, and worked very hard for, it) that the old Gas Institute did some very good work indeed. During the sixteen years of its existence, it produced some 140 papers, addresses, and lectures, on the commercial, social, chemical, physical, engineering, and general technique of the profession to which the members were allied, and so closely identified. He also found that the eloquence of the members of the gas profession had been fully maintained. No less—rather more in fact—than 2800 speeches had been made on the papers, addresses, and lectures delivered, and propositions submitted, during that period. This, he took it, was not a bad record at all; and considering the Institute only met once a year, he thought that, for expedition and perspicacity, it should commend itself to that talking-machine known as the Commons of the Houses of Parliament. If that body got through their business with the same alacrity as the old Gas Institute had done, they would witness fewer scenes in that memorable building at Westminster. He hoped the resurrected phœnix would do no worse than the old Institute. In saying farewell to it again, and looking to the future—now that the views of the majority had prevailed, and the Institute was dead and buried, with the hope of a joyful resurrection—if rivalry was to exist, he ventured to hope that it would be that truly honourable emulation which strove to spread knowledge and applied science for the good of mankind, and for the benefit of the gas industry. He also hoped they would hear no more of personal ambition, pique, and trade jealousies, of which they had had such an unfortunate experience in the past. He was sure the members would also agree with him in the expression of his ardent hope that, notwithstanding past differences of opinion, true fellowship would prevail in the new body, and that brotherly love would for ever continue. He heartily congratulated the Council on the conclusion of their labours; and, through the President, he desired to convey to them the thanks of the rank-and-file, of which he (Mr. Jones) was an humble member.

Mr. JOHN WEST (Manchester) said he did not think there was time for him to question his friend's arithmetical calculations regarding the number of subjects discussed and speeches that had been made during the existence of the Institute. While he thoroughly endorsed much that Mr. Jones had said, he did not think that he deplored the position they were in that day, nor felt so depressed as his friend seemed to be. They might appear to be dead for some little time, but he supposed there would be a resurrection some day. His sentiments in a measure were the same as his friend's; but, after the combination had taken place, it did not appear to him (Mr. West) that they would be joined together, as some had indicated, in a new society. To him it seemed that he was merely going to mix up with old friends once more, and that they, though severed for a season, were going to be one again. This he thought was a happy state of things; and no one appreciated more than he did that this

recombination (so to speak) had taken place. He knew it had caused their President and the Council a great amount of trouble; and, personally, he thanked them very much for what they had done in this important matter. He had not been at home lately, or he would have attended the last meeting; but he had known what was going on. It was with much pleasure that he seconded the vote of thanks to their worthy President for the trouble he had taken, and the trouble he would take to bring about the liquidation. It could not have been placed in more business-like hands; and he (Mr. West) was sure it would be finished and concluded in a business-like way.

The motion was heartily agreed to.

The PRESIDENT said he was much obliged to the members for their kind vote. He thanked them also, on behalf of the Council, for the way they had recognized their work. Mr. Jones had given them some useful information about the career of the Gas Institute. He believed the only regret Mr. Jones expressed was that the name was to be changed; but if he would only think of what had taken place lately as a wedding and not a death, he would remember that, when a lady was married, she generally changed her name. (Laughter.) He again heartily thanked the members.

Thus ended the last meeting of the Gas Institute.

The Institution Meeting.

A few minutes later, the hall was occupied by members of the Institution; and the PRESIDENT (Mr. Thomas Holgate, of Halifax) at once commenced the final work before them as a separate organization.

The SECRETARY (Mr. Thomas Cole) having read the notice calling the meeting,

The PRESIDENT mentioned that since the meeting on Nov. 1, certain alterations had been made by the Board of Trade in the Memorandum and Articles of Association; and he asked the Solicitor to explain them.

The SOLICITOR (Mr. H. A. Hood) said it would only be necessary for him to briefly explain to the members the alterations that had been made, as they were of no real importance, and they had been unanimously approved by the Council. Taking the Memorandum first, there was a small alteration, which stated that the Institution should not grant diplomas or titles. The really important alterations were on page 4. In sub-section (*u*) of clause 3, it was provided that the Institution should not impose on the members, or support, any trade union. In clause 4, a verbal alteration had been made which made it perhaps a little clearer than before that persons engaged in trade were not to belong to any class of member except that of Honorary Member. [Mr. Hood read the amended clause as quoted in the Institute proceedings.] Further commenting upon it, he said the effect of it was precisely what it was before. The real reason for the change was that the Counsel of the Board of Trade could not reconcile in his own mind the use of the word member in the sense in which the members themselves used it with the use of the same word in the sense in which the Act of 1862 used it, under which, according to Counsel's contention, the word had a purely statutory meaning, and included every class of member; and he did not wish to have a definition of any particular class of membership in the Memorandum, as it was generally considered that it was not the proper place for definitions. Therefore, it had been got over by the alteration of the wording. This brought him (the Solicitor) to the new clause 10, which he described as a remarkable piece of English composition, and he asked the members' close attention to it. [Mr. Hood read the new clause as set out in the report of the Institute meeting.] Further remarking upon it, he said that the clause as it stood before was tolerably clear; and the new one, which was required by the Board of Trade, merely expressed in a longer way what was expressed before. Then regarding Article 11, which was put in at the last extraordinary general meeting. It provided for abbreviated distinctive titles; but the Board of Trade had struck the clause out altogether —the reason being that distinctive titles of any kind were in future going to be eliminated from all articles of this nature, on the reasonable ground that distinctions ought to come from the Crown. Some members would perhaps be a little disappointed at this, as it was provided for at the last meeting. But those gentlemen would probably find some day or other distinctive titles for them in the "London Gazette"—in that part of the "Gazette" which contained distinctive titles. (Laughter.) Then Article 30, which dealt with the expulsion of members, had been slightly amended, in order to enable associate members to sign proposals for expulsion, and to attend and vote at meetings at which the subject of expulsion came up for consideration—the reason being that associate members had a right of voting as well as other members. In article 66, the same alteration had been made to enable associate members, as well as members, to give notice of their desire to bring forward any business in annual general meeting, because that clause formerly related only to such power being vested in members. The only other alteration of any importance was the small one in the Memorandum which provided that, if, on the winding up or dissolution of the new Institution, there remained any property at all after satisfying their debts and liabilities, if there should be no similar institution arising from the ashes of the dead one, such property should be handed over to some charitable object. This seemed to be a proper provision.

The PRESIDENT said it would be remembered that, at the former meeting, a resolution was passed, authorizing the Council to agree to any modification of the Memorandum or Articles that might be found necessary; and the Council had agreed to these modifications. It was therefore unnecessary for the members to confirm them at this meeting. He then moved—

That the Institution of Gas Engineers be wound up voluntarily.

Mr. H. E. JONES (London) seconded the motion, which was unanimously carried.

The PRESIDENT next moved that Mr. James William Helps be appointed Liquidator for winding up the Institution of Gas Engineers.

Mr. C. E. BOTLEY (Hastings) seconded the resolution; and it was carried unanimously.

THE PAST AND THE FUTURE—THANKS TO MR. HELPS.

The PRESIDENT said he did not think the members ought to separate without a word being said as to the work done by the Institution since its inauguration in the year 1890. He thought the aim which animated the gentlemen who started the Institution was a lofty one; and they had in their minds a desire to improve the technical knowledge and attainments of the profession. If they took a glance at the volumes of proceedings which had been published, they would see there ample justification for their endeavours. The names of the Presidents themselves were a sufficient indication of the character of the work carried out. The papers submitted to the meetings, and the visits to works both in Great Britain and on the Continent, had revealed to many of them facts and technical work that were hitherto closed to them. He thought, therefore, they would be very remiss if they did not, on this occasion, express their indebtedness to those gentlemen who had laboured so assiduously in the past for the success of the Institution of Gas Engineers, and their hope that the work of the united Institution would be still more fruitful of good to the gas industry and every member at large.

Mr. H. E. JONES said he thought they might on this occasion felicitate their worthy President on the expedition and cordiality with which he had, assisted by Mr. Helps (who had been an indefatigable and inexhaustible source of energy), brought this happy solution about. He likened the dissolution of the two bodies to the putting of seed into the earth, which decayed only to become the fruit of the next season. From this dissolution, they would have a new, a greater, and a more important Institution still. And it was to be hoped that it would not only maintain the high character which the President had referred to as having been attained by the papers and discussions of the Institution and the sister Institute, but that they would even improve; and this, in view of the larger number of members, and greater area from which the members would come, was not an unreasonable hope. He should like now to pay a personal compliment. As this was their last meeting, they ought to recognize, by a hearty vote of thanks, their admiration for the indefatigable services of their friend Mr. Helps, who had so long worked for the Institution, and in this particular matter so successfully by the great tact and ability which he had brought to bear upon it. He was sure their worthy President would second this, and signalize the end of their career by a vote to the man who had given them a happier and a higher existence.

The PRESIDENT said he should have the greatest possible pleasure in seconding this resolution; but he would prefer some gentleman—preferably one who had been connected with the Institution from the start—to say a few words in seconding it.

Mr. ROBERT MORTON said there was a certain amount of fitness that he should do so. He was one of the original members of the British Association of Gas Managers; and he had since been connected with the Gas Institute and the Institution of Gas Engineers. He had known Mr. Helps longer than he cared to state. He had watched his career all through, and he had grown with his years in usefulness to these societies, as he had to the Companies he had served. It was a great pleasure indeed to him to second the vote of thanks, which he was sure would be a hearty one. He also expressed the hope that Mr. Helps would be long spared to ornament the new Institution.

Mr. CHARLES HUNT (London), by invitation of the President, said he had much pleasure in supporting the resolution which Mr. Jones had proposed, and Mr. Morton had seconded. He had also had the pleasure of knowing Mr. Helps for a great number of years; and he knew how indefatigably he had worked to produce the present result. He (Mr. Hunt) was sure they all owed him a great debt of gratitude for his exertions and for the manner in which he had worked to bring about the amalgamation. Very heartily he echoed the wish Mr. Morton had expressed, that Mr. Helps might be long spared to them to be an ornament of the new Institution.

The motion was very cordially agreed to.

Mr. HELPS said he could not help feeling that that moment was a particularly proud one. At the same time it appeared to him he ought to look upon it with somewhat mingled feelings. He had been connected with the old Institution of Gas Engineers for a number of years now; and he must say that he had always found among the members the greatest kindness and good-fellowship. They had had some very enjoyable and instructive

meetings—in their small way perhaps, as compared with what the new Institution would be; but one could not help looking back upon those meetings with a certain amount of regret, when they felt that some of them were no longer possible. But that all sank into insignificance when one considered that the right thing, to all their minds, had now arrived. An industry such as theirs being represented by two bodies must have seemed an abnormal condition of things to everyone looking at them from the outside, as well as to anyone looking at them from the opposite side of the curtain. He was very pleased that he stood at that moment responding to this vote of thanks by the side of his old friend, Mr. Dougall, of Tunbridge Wells, because he was a member of the Institution, as well as perhaps a more prominent member of the Institute; and one could not help feeling that, whatever had been done by any member or members of the Institution, those efforts would have been practically in vain if they had not been backed up by the admirable and indefatigable work and the courteous manner of Mr. Dougall. He (Mr. Helps) thanked the members very heartily for the way in which the resolution had been received. He could assure them all that it had been a work of pleasure and a work of love to do what he could to bring about the amalgamation of the two Institutions; and he could only re-echo the wishes that had been expressed that the new Institution would have before it a very large world of usefulness.

With these appropriate words ended the final meeting of the old Institution.

ESSAYS AND REVIEWS.

THE PRESENT STATE OF THE QUESTION OF LIQUID FUEL.

The question of liquid fuel is one of the engineering and commercial problems of the day; and its actual position presents several aspects of particular interest for gas engineers. As we have shown on previous occasions, the commercial question of the use of liquid fuel is an ever-present one with gas managers, by reason of the fact of their being large manufacturers of it, in the form of coal or oil-gas tar. Consequent on this circumstance, coupled with the other of their being large users of fuel for the purpose of carbonizing coal, gas engineers occupy an inside position in regard to the economical or commercial question. From this point of vantage, the gas manager can decide instantly whether it is to his advantage to sell his liquid fuel or use it in his own business. Nor is this decision prejudiced or hampered in any degree by physical or mechanical considerations. Both kinds of gas-works fuel are on the spot when wanted; and either will answer the purpose. The only determining consideration, therefore, is that of relative value in the market; and experience has proved that when tar is unsaleable at the wholesale price of ½d., or even ¾d., per gallon, it is worth as much to burn. For some time past, this price has been exceeded in the market for gas-works residuals, as our weekly quotations show. As a consequence, tar is not burnt as a regular thing. Remarkably enough, during the whole period through which tar has risen in market price, a very conspicuous endeavour has been in progress having for its object the marketing of petroleum fuel oils for use as fuel; the said oils being offered at about 35s. per ton, delivered in the United Kingdom.

This, also, it is scarcely necessary to argue at length, is a matter of particular interest for British gas managers, inasmuch as many of them are in the market for the same class of petroleum product, as a raw material of gas manufacture, which is being pushed as liquid fuel. Consequently, the market values of the commodity for either purpose are mutually dependent upon one another. So much enterprise is being displayed in this connection, that it is expedient to review the actual condition of affairs periodically, in order to keep in touch with the causes which in the long run must affect prices. At the present moment, it is hardly possible to know exactly what to think of the fact of at least one important steamship line—trading, it is true, to and from oil-shipping ports—consistently and largely using as fuel the petroleum which it carries to sell at the above-named price, or thereabouts. The question that naturally arises on this evidence is, If the Shell Line find it advantageous to do this, why should not others? If the inquiry could be answered affirmatively, the demand for oil fuel which would follow would be so great that the comparatively small consumption for gas-making purposes would sink into insignificance, greatly to its economic detriment.

We have examined this problem of liquid fuel, under the conditions prevailing a few months ago, and committed ourselves to the conclusion that buyers of gas oil need not fear that the market would be raised against them by purchasers of oil fuel. Nothing has since transpired to induce a recantation of this opinion. It is not for us to say what price gas manufacturers can afford to pay for gas oil; but it is considerably more than the fuel value of the commodity, when purchased as imported. There are some interesting new facts in this connection which may be considered with instruction. The most important of these is the issue of a United States Navy report on the use of liquid fuel in warships. It appears that, yielding to urgent representations on the subject, the nature of which can be easily surmised by those who have followed the incessant Shell Line advertisements, a Board of Experiments was created so as to test the matter. Starting from the datum that fuel oil is anything from double to triple the cost of coal in the home waters where most big ships do their coaling—and where, among other things, the largest manufacturing industries are carried on on shore—the countervailing advantages of the oil fuel are held to be, higher calorific value, saving of stokers' labour, and economy of the store of fuel requiring to be kept or carried about. The first necessity is to reduce all these conflicting claims to a solid basis of fact. It is interesting to observe that, whereas one man who has an oil-burner to sell rates the steaming value of oil fuel at three or four times that of the best Welsh steam coal, weight for weight, when the trial was made in the United States Navy the best result obtained was an evaporative duty of 11 lbs. of water per pound of Texas oil. Nor is this matter for surprise, considering that the Beaumont oil used, which was supplied by the Standard Oil Company, had a calorific value of only 19,081 B.T.U., as against 14,500 units of best steam coal.

Of course, it is generally known that liquid fuel can be used for steaming and many other trade purposes, and was so used at least forty years ago. It is stated that there are in the Bureau of Steam Engineers in Washington over 2000 drawings and specifications of liquid fuel burning appliances, and new patents are being applied for at the rate of thirty a week. Yet inventors of oil-burners for furnaces do not usually know where the difficulty lies. There is no difficulty in satisfactorily burning moderate quantities of oil, and dozens of burners are available for the purpose. The difficulty lies in burning enough oil under forced draught to do what is wanted of it. That is to say, up to the present time it has not been found possible to make with any given boiler as much steam with oil as with coal. Obviously, a system of boiler-firing which does not admit of the steam production being forced, if required, to the utmost capacity of the plant labours under a grave disadvantage. Moreover, the requirements of burning oil throughout the whole range of possible or needed consumption smokelessly, and with reasonable economy of fuel, are not easily satisfied. In short, to burn oil fuel is one thing; to burn it as it may be required to be burnt is a totally different business.

It is to be noticed that the problem of satisfactorily burning a heavy oil fuel is that of atomizing the discharge into the furnace. So-called gasifying burners, in which the oil or liquid fuel is converted into vapour and gas by local heat, at or near the point of ignition, are only possible with the purified light petroleum distillates. A heavy oil must be atomized, pulverized, or sprayed; and this may be effected in at least four different ways. What appears to have been one of the most promising of the United States Navy experiments, which were all conducted on a Hobenstein water-tube marine boiler found to answer well with coal, was with Beaumont oil atomized by warmed air supplied under about 3½ lbs. pressure by a Roots blower. The proportion of carbonic acid in the flue gases never rose above 8·1, and the excess oxygen was about 10 per cent. Still, the smoke averaged 2·5 on the Ringelmann scale. This can scarcely be regarded as satisfactory, by reference to any standard of boiler-furnace efficiency. One criticism may be fairly addressed to the United States Navy results; and our contemporary, "Engineer," very pertinently makes it. There is no evidence that the Experimenting Board started from so high a level of accomplishment as the engineering advisers of the Shell Line have already attained. Although America is a land of oil, very little of scientific value has been done there with oil fuel. The inevitable American inventor has been active, as usual with him, in burning oil on paper; but when the Navy Board started out to ascertain what had already been done on their sides of the Atlantic and Pacific Oceans, they could not find any really respectable examples. This fact cuts both ways, if any use is made of it in argument.

We have nothing to do here with the military aspect of the use of oil fuel in warships; but passing mention must be made of one consideration which is of importance to consumers of this class of oil for any purpose. This is the proportion of water, which has been put as high as 60 per cent. of the bulk by one writer, who truly remarks that such consignments can only bring discredit and disappointment to the unfortunate consumer. With reference to this matter, it may be useful to mention a recent lawsuit between Messrs. Charles Price and Co. and the Thames Haven Oil Wharves, Limited, which turned upon this very question of the presence of water in a consignment of Borneo crude oil. The case named was heard by Mr. Justice Wills and a Special Jury, and after five days was settled out of Court. It transpired that the oil showed 33 per cent. of water as imported, for which an allowance was made; but after standing for six months, its composition did not improve. The issue between the parties was complicated by other questions, which the Jury answered partly for the plaintiffs and partly for the defendants; so that the amicable settlement advised by the Judge was the best termination of the case in the interest of the parties. Still, it left open the important practical question of the admixture of water, which it can hardly pay to bring to England from Borneo.

To return for a moment to the mechanical question of efficient atomizing of oil fuel, when this combustible has to be burnt in large quantity at a quick rate of consumption, acknowledgment

should be made of the simple explanation that was offered by "Engineer" to illustrate the chief difficulty met with in burning oil—the avidity of the oil flame for oxygen. It does not need any argument to convince an habitual user of a common oil-lamp that it is desperately easy to make an oil-flame smoke. The smokeless burning of oil in a lamp is the result of a balancing of conditions which must be ordered with the greatest nicety; and it must be far more so with a large furnace-flame of the luminous kind. It is practically impossible to provide the latter with oxygen enough, and not too much. "If we try to light a piece of paper at the top of a lamp chimney," says "Engineer," "it will be found that the paper may smoulder, but it will not flame. There is no free oxygen at the top of a lamp chimney." And when an ordinary lamp is doing its best, the flame is on the verge of smoking. Then the opening or shutting of a door will upset its equilibrium, so as to cause the production of smoke. Yet the control over the air supply of a lighting lamp given by means of the chimney is far more effective than anything that can be carved out of the exigencies of a steam-boiler furnace. All of which goes to show that, apart from the question of cost, the problems to be solved before fuel oils can claim equality with solid fuel for steam raising and similar purposes are of no easy order. They are little more than recognized, up the present time; and finality, even of posing the practical questions raised in this connection, has not been attained, to say nothing of the answers which must be forthcoming.

ELECTRIC LIGHTING MEMORANDA.

Prosecution of an Electrical Engineer at Taunton—Criminal Charges for Altering Meter Indices—The Case Dismissed—Dust Destruction and Electricity Generation as a Bye-Product.

An extraordinary affair has just come to a temporary halt at Taunton, and is worthy of mention here as throwing light upon the subject of the sale of electricity by meter in a fashion that, so far as memory serves, is unprecedented. It was a case in which criminal law proceedings were taken at the instance of a consumer of electricity supplied by the borough, against Mr. E. B. Thornhill, the Borough Elcctrician, for falsifying an account with intent to defraud. The accused was charged with seven offences—all, let us hasten to add, in the interest of his employers, the Taunton Town Council—among which were included the unlawful alteration of the indices of consumers' electricity meters. The mere statement that such a thing has happened is enough to open the eyes of those amiable theorists who imagine that local authorities engaging in trade can do no wrong. We do not believe, as has already been remarked, that the whole history of company trading in gas supplied by meter has produced such an example of bitterness between the parties to this kind of business. It has been reserved for municipal traders to have to defend their principal officer on charges of this nature—a striking illustration of the difference between municipalism in theory and in fact. The result of these amazing proceedings does not affect this glaring aspect of the case.

The facts are as follows: and they are full of instruction for those who, like some of our electrical friends, entertain hazy notions as to the legal aspect of the supply of a commodity by meter. It was alleged by the prosecuting Solicitor that Mr. Thornhill, in his capacity of Manager of the Taunton Corporation Electricity Department, had followed a system of "correcting" the registrations of the consumers' meters, by instructing his assistant, who was the meter inspector, to put on 50 or 100 units wherever he thought the consumer would stand it and knew no better. It was ascertained that the defendant's orders to this effect were written on the meter inspector's register sheets, and that, in pursuance of these instructions, certain specified alterations of the quantity of electricity charged for were made. These arbitrary charges were alleged to be fraudulent. As can easily be understood, the action of the consumers who found out that they had been treated in this way in making it a criminal matter, greatly upset the town. The newspaper reports of the proceedings aver that the keenest interest was taken in them—partly owing to the circumstance that for a long time past the question of the electric light charges in the borough has occupied a good deal of public attention. A striking peculiarity of the hearing was that all the Borough Magistrates who are also members of the Corporation were, of course, precluded from taking part in it, which is a brilliant instance of the nature of the consequences that may follow the course of municipal action often described in these columns as the relinquishment by the chief magistrate of the Sword of Justice for the shopkeeper's apron. The Borough Magistrates' Clerk was, moreover, unable to act by reason of his being also Town Clerk, and an acting substitute had to be imported from Bridgwater.

Fortunately, we are relieved of the unpleasant task of dealing with the merits of the case, because an objection taken by Counsel for the defence to the nature of the proceedings, and to the lack of any proof of guilty intention on the defendant's part prevailed; and the Bench dismissed all the charges. It remains to be seen whether any and what steps the complainants will take in order to have an investigation into the facts; but it is plainly preposterous that this should be done under the guise of an indictment of the Manager for fraud. There is not, as the Magistrates justly held, any case for his commitment on this record; and it is not for us to suggest how the matter should be treated. As it stands, however, the case is positively crammed with "morals" of sorts; and there is ample justification for the interest is has aroused locally, and will attract throughout the electrical engineering profession when the news is spread abroad. We are not going to draw one of these morals, clamorous as they are; but are content for the time being to tell the story as an illustration of actual municipal electric lighting experience, which is apt to be very different from what it is pictured to be by some.

After a long period of suspense, the best electrical engineering opinion has definitely pronounced against the plausible, but most illusory, idea of trying to combine town refuse destruction with the generation of electric light for distribution. This is to be gathered from the comments made upon a recent paper on the subject which upheld the contrary view. The truth of the matter is that the merit of the combination vanishes from the moment when it is ascertained that the destruction by fire of the refuse of any locality is incapable of generating more than a small fraction of the heat required to make the electricity required for lighting alone, to say nothing of other purposes. It was Professor George Forbes who, many years ago, expressed the view that a town could light itself by its own dust and refuse; and others have laboured in vain ever since to make his words good. Up to a point, and for a time, there may be something to say for the combination, especially where the best site for the electricity works is also the best for the refuse destructor. Yet, notwithstanding the improvement of dust destructors, which is considerable and highly creditable to the makers of these appliances of civilization, their value as sources of the bye-product—heat available for steam raising—is limited. Where this has to be supplemented by coal, it must be an exceptionally well-matched combination which will continue to give unalloyed satisfaction. Whereas the advantage of the connection—it has but one—must be a diminishing quantity with the growth of the predominant partner, the drawbacks are likely to exhibit the opposite character. This is not the fault of destructors; it is the effect of circumstances.

THE GAS AND WATER STOCK MARKET.

(For Stock and Share List, see p. 1486.)

Last week opened badly enough in the Stock Markets. Business was agitated and kept at a low pitch. Money hardened perceptibly, and the fortnightly settlement was looked forward to with some degree of apprehension; so that by Wednesday the position was rather gloomy. But soon things began to take a turn. When the Bank of England meeting on Thursday passed off without a rise in the rate, and when the settlement progressed without any failure being reported, there was a feeling of relief, which steadily gained ground until at the close the outlook was quite cheerful. In most departments prices still showed a shrinkage; but Consols were a notable exception. In the Money Market, there was a sharp demand for Stock Exchange and other requirements; and rates were pretty stiff, though easier at the close. In the Gas Market, the business done was on the whole moderate—only the opening and the closing days of the week exhibiting anything like activity. The tendency was very flat, all changes of quotation with a single exception showing a more or less considerable drop. This treatment seemed to be independent of the different positions and prospects of the several undertakings affected, all being served impartially alike. In Gaslight issues, the ordinary opened at 88, and for a little while kept up pretty well; then it gave way, and quickly went downhill, till on Saturday it changed hands once at 84. The secured issues, too, felt the influence; and the maximum and preference receded. South Metropolitan was in equally evil plight. It opened at 121 on Monday, and subsequent dealings were not far below that figure until Saturday, when it dropped sharply to 118. Commercials were limited to a couple of cheap bargains in the old stock; but the quotation stood unchanged. Among the Suburban and Provincial undertakings, there were some slight shrinkages in Brentford, British, and Crystal Palace. In the local Exchange, Liverpool was a fraction easier. The Continental Companies boasted the only advance—Imperial gaining a point, while the others were quiet and unchanged. Among the rest, Malta was a little lower. The Water Companies were very quiet, expectant of the great struggle over their fate about to be waged in Parliament. They do not seem apprehensive or as if they were going to take fright. The one change was a slight advance in East London.

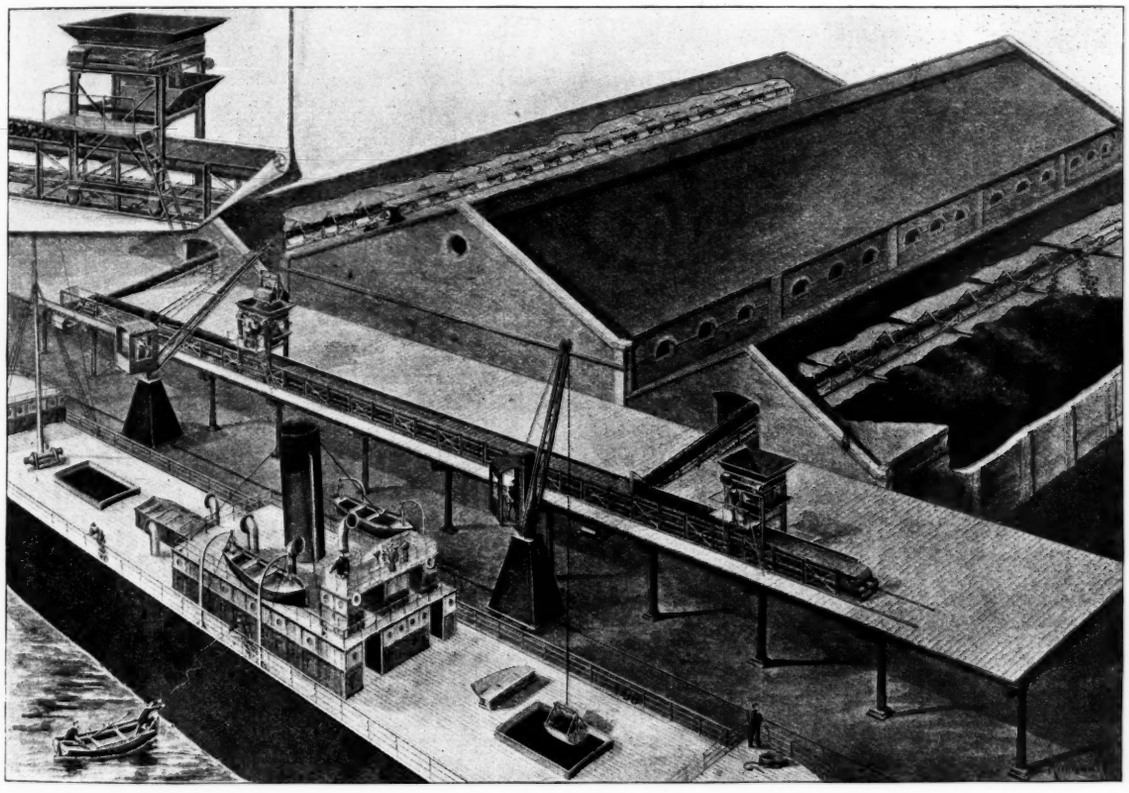
The daily operations were: Gas opened fairly brisk on Monday; but dealings were to a great extent in Gaslight issues only. Imperial advanced 1; but British fell ¼. Tuesday was a very quiet day; and the only movement was a fall of 1 in Brentford old. On Wednesday, business was still much restricted, and further weakness was apparent. Gaslight ordinary and South Metropolitan fell 1 each. East London Water rose 1. Thursday was a little more active; and only Malta receded ¼. East London Water rose 1 more. Friday was rather quiet and decidedly weak. Gaslight ordinary fell 1, and South Metropolitan 2. On Saturday, these two stocks were freely offered. Gaslight ordinary, maximum, and preference fell 1 each, and Crystal Palace was 1 lower.

COAL-STORING PLANT AT THE IPSWICH GAS-WORKS.

In the discussion during the past few years of matters touching upon gas-works economics, more consideration has been given to the questions of hot-coke conveying and inclined retorts than to other branches in which economy and a lessening of manual labour may be, and is in many cases, effected. So far as public discussion is concerned, the subject of the transport of coal has only occasionally come under notice in connection with our home gas undertakings; and yet it is a matter of considerable moment to most gas-works, in greater or less degree according to situation. The cost of delivery of coal from the point of consignment (by water or rail) into coal-stores or retort-houses is not one which, in these competitive days, can be neglected. For gas-works located alongside a railway, and conveniently arranged for sidings leading direct to coal-stores or retort-houses, the coal-handling problem is not one difficult of solution. But it is not every gas-works that is so happily circumstanced; and then, at some time or other, the question is bound to arise as to whether new means cannot profitably supplant the old method of transferring the coal to its ultimate destination in the works. There are other works, too, that are blessed with a water-route as well as rail communication with the coal-fields; and in their case a dual system of transmission from the points of delivery has to engage the engineer's attention.

The Ipswich Gas Company's works are among those that are situated on the banks of a navigable water-way—the River Orwell, at the mouth of which is situated the pretty town of Felixstowe. As the members of the Eastern Counties Gas Managers' Association well know, when the tide is in, a more delightful river for beautiful and varied scenery cannot be found in East Anglia. It is by way of this river (which allows steamers carrying up to 1200 tons to be employed for the conveyance of coal) that, in large measure, the Ipswich Gas-Works are fed with their prime necessary; and it is to deal with the coal as delivered by ship that the Company have, under the advice, and according to the plans, of their Engineer (Mr. John T. Jolliffe) put down a plant that is complete in every respect, and somewhat unique. To Mr. Jolliffe we are indebted for being to-day in the position to describe the principal features of the plant, which, we are sure, will be of general interest.

The scheme (which was carried out entirely by the New Conveyor Company, Limited, of Smethwick) comprises the unloading of the coal, its weighing, and conveyance direct to the coal-stores.

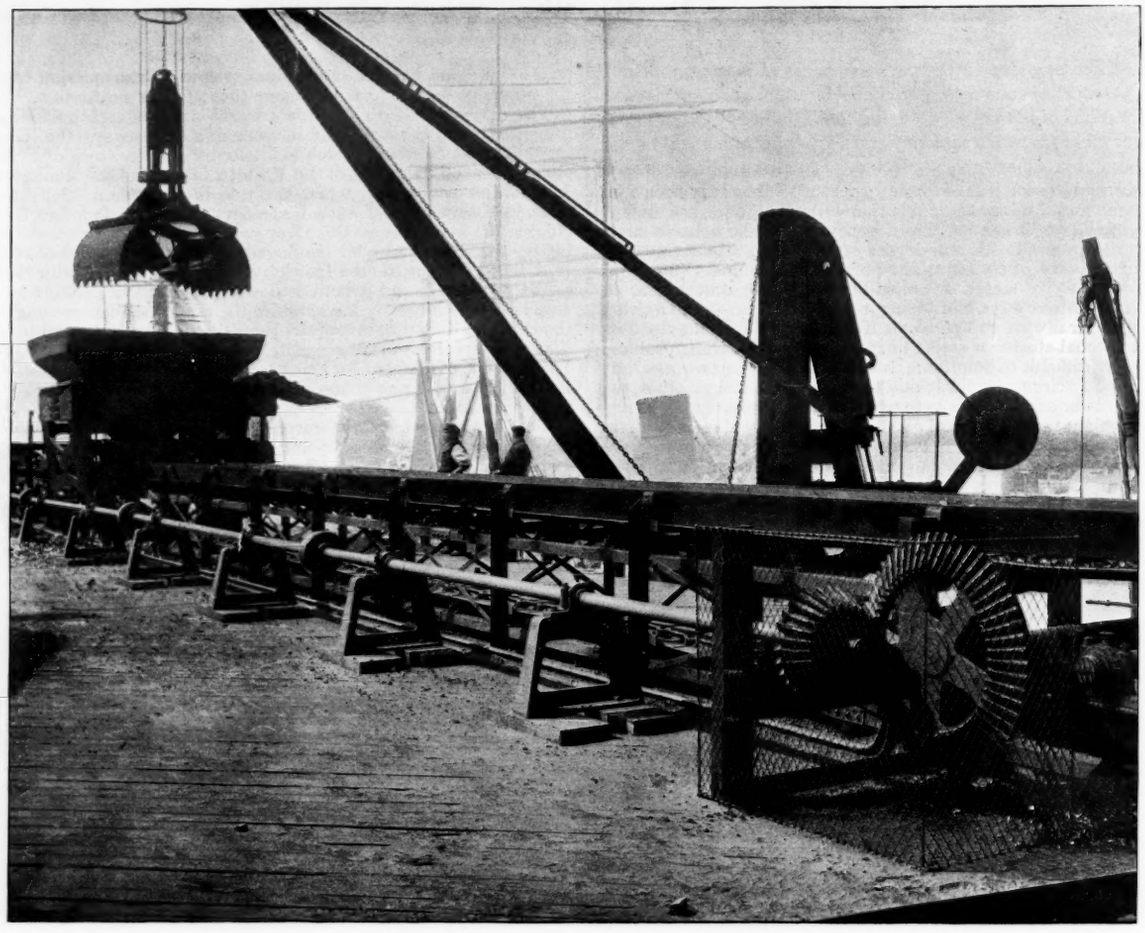


Perspective View of the Coal Raising, Weighing, and Storing Plant.

(From a Drawing.)

The main stores (as the general pictorial view shows) flank No. 1 retort-house on either side, with auxiliary stores in the space between Nos. 1 and 2 houses, as seen in the general plan of the conveying plant. The side stores are 160 ft. long by 33 ft. wide, and each has a capacity of 1400 tons; while the auxiliary ones are equal to 2100 tons. The arrangement of the plant will be readily comprehended from the plan and the photographs (which Mr. Jolliffe has kindly supplied); and therefore it will be unnecessary to enter into a description in great detail. For the raising of the coal from the holds of the vessels, two large Armstrong-Whitworth cranes of the hydraulic type are fitted on the landing-stage. These cranes are furnished with Hone's automatic grabs, each of which makes one journey per minute, and lifts 20 cwt. It therefore follows that each grab is capable of raising 60 tons per hour, and the pair 120 tons. This latter figure, then, may be taken as the capacity of the storing plant. The Hone grabs deposit the coal into the weighing-machines, of which there are also a pair; and, after being weighed, the coal is dropped on to a 30-inch wide reversible conveyor for transmission to the stores.

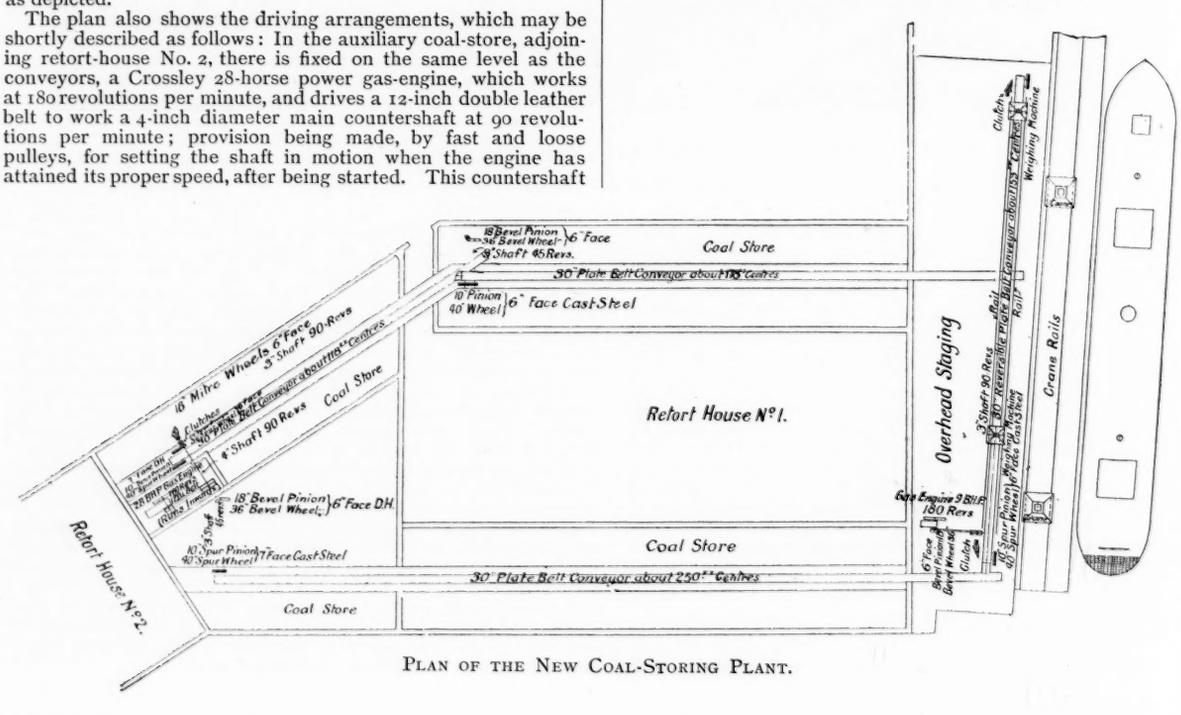
This reversible conveyor is 153 feet long, and is driven by a 10 brake horse power Crossley gas-engine fixed on the elevated stage at the end of the retort-house. The conveyor is constructed as follows: The steel frame is built up of 3 in. by 3 in. angle section uprights, 6 feet apart, and having cross 3-inch angles at the bottom to act as stays and feet. To the uprights are riveted four longitudinal 3-inch angles, which support the bearings. The frame is securely riveted, and is provided with $1\frac{1}{2}$ in. by $\frac{1}{4}$ in. flat-bar bracing, both longitudinally and transversely, as shown in the photographs. The bearings (just mentioned) are $1\frac{1}{4}$-inch bore and 2 inches wide, spaced 3 feet apart on the top angles, and 4 feet on the bottom—all being fitted with lubricators. The bearings carry $1\frac{1}{2}$-inch diameter spindles, which have cast on them two iron rollers. These rollers on the top spindles are 6 inches diameter by 3-inch face, cast on the spindle with 1 ft. 6 in. between them, as in that position they are immediately under the double chains. The bottom rollers are 6 inches diameter and 2 inches wide, and carry the return plates. The moving part of the conveyor consists of steel plates $\frac{3}{16}$-inch thick, 30 inches wide, $13\frac{3}{8}$ inches long, with $1\frac{1}{2}$-inch lap, joggled $\frac{1}{4}$-inch deep, so that the steel belt is continuous and flat. These plates are fixed with four rivets to the double chains, which are 12-inch pitch, 4 inches wide, with $\frac{3}{4}$-inch cottered connecting-pins. To prevent side movement on the carrier, Pritchard's patent side-rollers are fixed top and bottom; and these (those experienced in the work inform us) have been found invaluable on all these plate-belt conveyors.



THE REVERSIBLE CONVEYOR, WITH ONE OF THE GRABS AND WEIGHING-HOPPERS.

Having now briefly described the reversible conveyor, we may return to the general arrangement. From the reversible conveyor, on to which we have seen the coal deposited from the weighing-machines, the coal is fed on to either or both the longitudinal conveyors as desired. The one carries the coal into the store on the right-hand side of No. 1 retort-house, or on to the diagonally placed conveyor in the auxiliary store (see plan). The other or larger conveyor feeds the store on the left-hand side of the retort-house, or the second auxiliary store situated in the rear as depicted.

The plan also shows the driving arrangements, which may be shortly described as follows: In the auxiliary coal-store, adjoining retort-house No. 2, there is fixed on the same level as the conveyors, a Crossley 28-horse power gas-engine, which works at 180 revolutions per minute, and drives a 12-inch double leather belt to work a 4-inch diameter main countershaft at 90 revolutions per minute; provision being made, by fast and loose pulleys, for setting the shaft in motion when the engine has attained its proper speed, after being started. This countershaft drives (*a*) the diagonal conveyor, which is 128 feet centres; (*b*) the right-hand conveyor, 178 feet centres; and (*c*) the left-hand conveyor, 250 feet centres. The means employed to accomplish these various motions are: On the 4-inch shaft is an 18-inch spur pinion, which is bushed, and provided with a sliding clutch. This drives on to a 36-inch spur wheel (6-inch face), fixed on a $3\frac{1}{2}$-inch countershaft, which, while running at 45 revolutions per minute, drives on to the end shaft of the conveyor, with 4 to 1 spur gear —the sizes being 10 in. by 7 in. pinion, and 40 in. by 7 in. wheel,


Coal Store
30" Plate Belt Conveyor about 178 Centres
10 Pinion 40 Wheel 6" Face Cast Steel
Retort House No. 1.
Overhead Staging
Crane Rails
Coal Store
30" Plate Belt Conveyor about 250 Centres
Coal Store
Retort House No. 2.

PLAN OF THE NEW COAL-STORING PLANT.

both double helical pattern. The end shaft is thus run at 11·25 revolutions per minute; and this gives a travel of 70 feet per minute to the conveyor plates.

This, we think, is (with the photographs and drawings) a sufficient general description of the new coal-handling plant, which it is a satisfaction to learn from Mr. Jolliffe, and must be even

Another View of the Reversible Conveyor.

more so to the New Conveyor Company, has so far rendered a good account of itself, and has fully met his expectations. The cost of discharging and conveying the coal into store has been reduced by the plant from 8½d. per ton to 3d. per ton. This, on 37,000 tons, amounts to a saving of £847 per annum. With such figures as these before us, nothing need be said as to the wisdom of installing this complete plant at Ipswich.

The will, with codicils, of the late Mr. John Imray, whose death was noticed in the "Journal" a few weeks ago, has been proved. The estate is entered at £69,041.

According to "La Chimica Industriale," an artificial asphalte can be made by mixing 50 parts each of tar and resin, and from 10 to 20 parts of the residue from the distillation of petroleum. These ingredients should be heated first to 320° and afterwards to about 350° Fahr., and then have from 3 to 6 parts of sulphur added to them with brisk agitation.

In an article, on "The Theoryof the Gas-Mantle," in the current number of "Nature," Mr. Maurice Solomon reviews various papers which have been published dealing, either directly or indirectly, with the cause of the high efficiency of the incandescent mantle; among others, those by Messrs. White, Russell, and Traver, and Professor Armstrong, which have been noticed in our columns.

In a recent number of the "Chemische Revue über die Fett und Harz Industrie," Monsieur L. E. Andès dealt with the subject of the influence of rust on paints applied to ironware. As the result of a series of experiments, he has come to the conclusion that if a slightly rusty iron surface be thoroughly dry at the time it is painted, the rusting will not proceed any farther, and the paint will adhere satisfactorily; but if the surface be wet, or it be rusted to any considerable depth, the paint will afford no permanent protection.

An International Congress of Applied Chemistry is to be held in Berlin during Whitsuntide week next year; and a Committee of the Society of Chemical Industry has been formed to co-operate with the other British Chemical Societies in endeavouring to secure an adequate representation of the British chemical industry. Among the subjects to be treated are: Analytical Chemistry; Chemical Industry (Organic and Inorganic Products); Chemistry of Agriculture; Hygiene; Electro-Chemistry and Physical Chemistry; and Legal and Economic Questions connected with the Chemical Industry. The Secretary of the Congress is Dr. G. Pulvermacher, Marchstrasse No. 21, Charlottenburg, near Berlin.

PERSONAL.

At the meeting of the Tyldesley District Council last Wednesday, the resignation of Mr. W. H. S. Gendall, the Gas Engineer and Manager, was accepted.

Mr. H. A. Willey on Friday last subscribed the roll, and was admitted a Freeman of the City of London, having joined as a Liveryman the Worshipful Company of Makers of Playing Cards.

At a meeting of the Gas Committee of the Beverley Corporation last Wednesday, the 65 applications received for the position rendered vacant by the appointment of Mr. J. Gibson to Leigh, were considered, and five names were selected. The choice of the Committee eventually fell upon Mr. F. W. Oldfield, Assistant to Mr. W. B. Reidie at the Barking Gas-Works.

Mr. James Wynne, an Assistant in the Dundee Corporation Gas-Works, has been appointed Manager of the Carnoustie Gas-light Company, in succession to Mr. J. W. Napier, who is going to Alloa. The Directors first of all selected Mr. T. O'Neill, the Manager of the Dunbar Corporation Gas-Works; but, on receiving an offer of increased remuneration from his Committee, he declined to take the position.

When intimating in last week's "Personal" column the appointment of a Manager for the Barnoldswick Gas-Works, the name of the successful applicant for the position—Mr. Harry Scott—was by inadvertence omitted, and it was in consequence made to appear that Mr. J. H. Crowther, of Wallasey, was to take the place of Mr. Garlick, who has gone to Glastonbury. Mr. Scott, who has been with Mr. Crowther as a pupil and otherwise for some seven years, will take up his duties at Barnoldswick in the course of a fortnight.

We are informed by Mr. John Grice, the Chairman of the Metropolitan of Melbourne Gas Company, who has been for some weeks in England for the purpose of selecting a gentleman to fill the post of Assistant-Engineer to the Company recently advertised in the "Journal," that he has, conditional on the medical examination being passed satisfactorily, offered the position to Mr. P. C. Holmes Hunt, the eldest son of Mr. Charles Hunt, late of Birmingham. For about four years Mr. Philip Hunt assisted his father at the Windsor Street works; and in June, 1900, he was appointed by the Gas Committee to be Manager of the Adderley Street works, though he had for some months previously been actually in charge of this station.

OBITUARY.

The recent death is announced of Mr. W. Hudspith, the Chairman of the Haltwhistle Gas Company. The deceased gentleman was in his 78th year.

The death occurred suddenly, on Monday last week, of Mr. Robert Hamilton, Inspector of Lighting to the Corporation of Glasgow. Deceased had for about two years been suffering from an affection of the heart, and in the spring of the present year he was laid aside for a short time. Since then, however, he had been able to attend regularly to his duties. On the morning of the above-named day, he was in his office in College Street by ten o'clock, and subsequently drove to the Alexandra Park and to Glasgow Green with reference to the erection of additional lamps there. He returned to his office about half-past eleven and sat down at his desk. An hour afterwards he complained of pain, and went home. His medical attendant was summoned; but Mr. Hamilton passed away within half an hour after he left the office. The deceased had been about 46 years in the service of the Corporation. Before his appointment as Inspector of Lighting, about 22 years ago, he was a Surveyor in the Gas Department. He has left a widow, a grown-up son (in India), and an unmarried daughter. He was held in high esteem.

NOTES.

Mechanical Equivalent of the Hefner Unit of Light.

A recent communication by Herr Angström to the "Physikalische *Z*eitschrift" gives an account of an investigation which he has made on the light of the flame of the Hefner lamp. He divided his examination of the lamp into two sections: (1) The determination of the total radiation; (2) the determination of the ratio of the light radiation to the total radiation, For determining the total radiation, he used his own type of compensating pyrheliometer. He obtained results in perfect concordance for distances of 16 ft. 6 in. and 3 ft. 3 in. from the lamp. The lighting effect of the radiation from the lamp was also determined by a new method, as follows: The radiation from the flame was broken up by a spectroscope; and the invisible parts of the spectrum were cut off by screens, while the illuminating rays were united by means of a cylindrical lens so as to give a white image in the photometer. A second flame was so arranged that the radiation from it, falling directly upon the photometer, was

photometrically equal to the first. There were thus two sets of radiators of physiologically equal power and composition; but the first contained only light rays, while the second was the corresponding total radiation. On exchanging the photometer disc for a bolometer or a thermo-electrical pile, the energy of both sets of radiations, and therefore their ratio, could be determined. The mechanical equivalent of the Hefner unit of illuminating power was proved to be, in round figures, 8 ergs per second.

Cleaning Subsidence Reservoirs.

According to some particulars given in the "Engineering Record," the Settling Basins at the St. Louis Water-Works had deposited in them during the year ending in April last 466,252 cubic yards of sediment, of which one-half was removed by manual labour at a cost of 1·017 c. per yard. Each of the six basins measures 672 ft. by 400 ft. In his annual report, Mr. Edward Flad, the Water Commissioner, describes the hydraulic dredge which was built for cleaning the basins while in regular use. A centrifugal pump, electrically driven, is mounted upon a barge, and is provided with a suction pipe, extending to the bottom of the basin, and with a flexible floating pipe which discharges over the side. The barge is 16 ft. wide by 21 ft. long and 3 ft. 9 in. deep, and draws about 26 inches. It is provided with a deck house, and it is propelled across the basin by a hand-winch operating on a stationary rope stretched for the purpose. The ultimate design contemplates a propelling arrangement electrically driven. The main pump is a 12-inch Morris centrifugal pump connected directly to a 90-horse power motor. There is also a jet pump which furnishes a series of 13 jets at the mouth of the suction-pipe for dislodging the mud. This pump is a 4-inch Morris centrifugal pump, connected to a 20-horse power motor. The suction-pipe of the main pump is 12 inches in diameter, and expands at its lower end into a flaring or fan-shaped mouthpiece, having an opening 10 feet wide and about 1½ inches high, and provided with rollers which rest on the concrete bottom. The floating discharge-pipe consists of 21 sections, each 21 ft. 6 in. long, connected by 3½ feet of rubber hose. The discharge-pipe proper is 14 inches in diameter, and is supported by two floating air-tight pipes, 12 inches in diameter, one on either side.

Professor Lewes's New Course of Cantor Lectures.—The second of these lectures was given at the Society of Arts last night. Professor Lewes dealt further with the subject of the dilution of coal gas by gases produced by other processes. He then passed on to consider the effect of lowering the candle power of gas on its calorific value; and this led to some observations upon the photometry of low-grade gas and the conditions under which its illuminating power is best developed. A full report of the lecture will appear Tuesday next. On the 8th inst., Professor Lewes will discourse upon the incandescent mantle, and has promised to make this lecture specially interesting.

Manchester District Institution of Gas Engineers.—As already announced in the "Journal," the 132nd quarterly meeting of the Institution will be held at Bradford next Saturday, under the presidency of Mr. Arthur Graham, of Mansfield. We learn from the programme issued by the Hon. Secretary (Mr. R. G. Shadbolt, of Grantham) that the members will assemble at the New Fire Station, Nelson Street, which will be open for their inspection, by the courtesy of Mr. Freeman, the Chairman of the Fire Brigade Committee, and of Mr. James Scott, the Chief Officer of the Brigade. Luncheon will be served at the Midland Hotel, where the meeting will be held at three o'clock. The business will include three papers—one by Mr. J. H. Brearley, of Longwood, on "The Lighting of Factories;" another by Mr. J. H. Buckley, of Formby, on "Experiences of Incandescent Street Lighting;" and the third by Mr. H. Fowler, Gas Engineer to the Midland Railway Company, of Derby, entitled "Notes on the Working of a Portable Illumination Photometer." It will be seen that the members will have a pretty full day's work to get through.

Caucasian Petroleum Company and the Russian Industry.—The first cargo of Russian kerosene, shipped by the Caucasian Petroleum Company, arrived in the Thames lately; part of the cargo being discharged at Thames Haven, and part into the Company's own tanks at Bow. The oil is said to be of a superior quality, and has a flash-point of 90° Fahr. The progress of the Company (according to the "Petroleum Review") has been rapid indeed, and shows with what energy and purpose the work of organizing export and import facilities has been carried out. It is only about two months ago that the formation of the Company was announced; and they have already commenced to deliver oil in tank waggons and road cars. In the erection of tank storages in various parts of the country also great progress has been made. The rapidity with which the Bow tankage has been installed has been due to the energy of the Contractors, Messrs. Samuel Cutler and Son, of Millwall, which has been a source of great satisfaction to the Company. The Baku refiners are naturally watching the movements and progress of the Caucasian Petroleum Company very closely; and, thanks to the activity already displayed, these refiners are now able to obtain a profit for oil, which only a few months ago stood at 5 copecs per pood, but for which 15 to 16 copecs are now asked—thus leaving a good margin.

TECHNICAL RECORD.

THE FUTURE OF COAL GAS AND ALLIED ILLUMINANTS.

[A Series of Cantor Lectures delivered before the Society of Arts.]

By Professor Vivian B. Lewes, Royal Naval College, Greenwich.

I.—Monday, Nov. 24.

Few of the great industries have undergone such radical changes in condition as have fallen to the lot of gas manufacture during the past twenty years; and my desire is to show how these changes have arisen, and the direction in which they tend, together with such side-issues as must of necessity be satisfactorily settled before the altered condition can bear full fruit for the consumer of gas, and before the gas manager can give his full adhesion to the altered state of things.

When in the early years of the last century coal gas became a commercial reality, the one end and aim of the manufacturer was to produce his gas; and such details as purity, illuminating and calorific value, never troubled his mind. As time passed on, however, and competing companies vied with each other in their endeavour to secure customers, advantages had to be offered to coax customers from the enemy's camp; and those who remember the battle of the two then existing City Companies with another proposed rival in 1847-8-9, and the way that the gas consumers in the City were at that period pestered and pamphleted by the supporters of the rival schemes, will realize that even in those days gas management was not a bed of roses. The outcome of the rivalry was the introduction, in the early fifties, of a standard of illuminating value and a string of parliamentary requirements which have ever since safeguarded the consumer and harried the gas manufacturer.

In 1850, an Act was passed which provided that a consumption of 5 cubic feet of gas per hour should be equal to the light of 12 wax candles of the size known as sixes; the burner employed being a brass argand burner with 15 holes. In 1860, another Act changed the illuminating power to 12 sperm candles, which meant an increase of some 16⅔ per cent. in the illuminating value of the gas, owing to the fact that the wax candles originally used were only equal in illuminating power to 10·3 sperm candles as at present employed for testing purposes. In 1868, the illuminating power was again raised to 14 candles; while in 1876 the present 16-candle standard was reached.

The amount of light emitted by the gas, however, was still insufficient to satisfy the desires of the consumers, who, utterly ignoring the fact that the illumination to be derived from coal gas was quite as much dependent on the burners employed as it was upon the standard illuminating value, vented their dissatisfaction at the light emitted by small flat-flame burners by clamouring for a higher quality of gas; and even thirty years ago the great aim of the gas-consuming public was to obtain the highest candle power gas that could be squeezed out of the gas company in order that they might gain something like decent illumination from the flat-flame burners then almost exclusively used, and which were as a rule so small as to entirely destroy the value of the gas. It was at this period that the anomaly became common of seeing a town supplied with gas of over 20-candle illuminating value swathed in semi-darkness; while another with the much-abused 13 or 14 candle gas, supplied at good pressure and burnt in decent-sized burners, was well illuminated.

It was at this time, also, that some of our most able chemists ranged themselves on the side of the votaries of high illuminating power; and even such practical minded men as the late Sir Edward Frankland clamoured for the introduction of high illuminating power gas, such as is produced from cannel, in place of 16-candle coal gas—the general line of argument being well shown by portions of Sir Edward Frankland's introduction to the section of his published researches which deal with applied chemistry, in which paragraphs like the following occur: "Coal gas is not suitable for use in dwelling-houses, by reason of its very low illuminating power. One hundred cubic feet of coal gas contain only 4 cubic feet of illuminating gas; the rest is mere rubbish which heats and pollutes the air in which the gas is consumed. . . . It cannot be too widely known that coal gas, although it costs less per 1000 cubic feet, is, light for light, much dearer than cannel gas."* Even now, when altered circumstances make high-power gas anything but desirable and economical, there are not wanting advocates who, undaunted or perhaps ignorant of the practical side of the question, still try to bolster up the old idea.

It was in the latter part of the eighties that the lot of the worried manager was made even harder by the rise in price taking place

* Frankland's "Experimental Researches in Pure, Applied, and Physical Chemistry," 1877, p. 488.

in cannel coal, on which, up to that time, he had entirely relied, in admixture with ordinary gas coal, to give those higher grades of illumination demanded by the fashion of the time, and which, although it ruined his coke, yet proved an efficient and reliable servant. This increase in price became so serious that, in 1889, the Gaslight and Coke Company commenced experiments which led to the introduction of carburetted water gas in place of cannel as an enricher. This process proved itself a most valuable addition to the manufacture of coal gas, and rapidly gained favour and popularity, not only as giving an easy means of raising the candle power of poor gas, but also as a stand-by in case of any sudden calls upon the productive power of the works. About this same period, also, another method of enrichment was introduced, which consisted of adding to gas which did not fulfil the parliamentary requirements the vapours of such highly volatile hydrocarbons as petroleum spirit and benzol, which, on account of their high illuminating value, gave the necessary increase in the candle power by the addition of an amount of vapour not likely to afterwards recondense from the gas.

While these changes were taking place in gas manufacture, rivals, which seemed to threaten its very existence, had forced their way to the front; and with the electric light largely used by the rich, and petroleum reduced to a price at which even the poorest could afford its use as an illuminant, the field of utility seemed to be rapidly disappearing from beneath the feet of the gas industry. But when things were looking at their blackest, there slowly struggled into prominence and commercial success a factor which at once restored coal gas to its position of primary importance.

It was in 1885 that the researches of Dr. Auer von Welsbach culminated in the production of the incandescent mantle, which, frail and unsatisfactory in its earlier forms, was gradually so improved in composition and manufacture that, by 1892, it became a brilliant commercial success, and placed in the hands of the gas industry a weapon which rendered their position unassailable in competition with electricity. Looking at it from a common-sense point of view, the incandescent mantle is merely a method of enrichment, as, instead of increasing the illuminating power of a flame by crowding into the gas more and more hydrocarbons, which during combustion were capable of separating carbon particles which, by their incandescence, would increase the amount of light emitted by the flame, and *pro rata* the amount of heating, with the mantle the flame is charged with incombustible particles of far greater light emissivity than the carbon possesses, which do their work without that increase in the temperature of the atmosphere inseparable from the other processes. It is the introduction of the incandescent mantle and the improvements which are possible in its construction which really give the possibilities to the gas of the future.

Taking now the enriched—or, as some preferred to call it, adulterated—16-candle gas as supplied during the nineties, the light which can be obtained from it is entirely dependent upon the burner in which it is consumed, and which may be stated as follows:—

TABLE I.

Light Emitted per Cubic Foot of 16-Candle Gas Consumed.

Burner.	Candle-Units.
Incandescent, high pressure	30—35
,, Kern	20—25
,, ordinary	14—19
Regenerative	7—10
Standard argand	3·20
Ordinary argand	2·90
Flat-flame, No. 7	2·44
,, No. 6	2·15
,, No. 5	1·87
,, No. 4	1·74
,, No. 3	1·63
,, No. 2	1·22
,, No. 1	0·85
,, No. 0	0·59

In considering the value given to the gas by these burners, it is seen that, according to the method by which it is burnt, the consumer may obtain anything from 35 candles down to less than 1 candle per cubic foot of gas. It must also be borne in mind that the burners employed in these tests were all good, well-made burners, giving the best duty that can be obtained from them; while an examination of the burners used in consumers' houses shows that in most cases any antiquated and corroded burner is considered good enough at which to burn the gas, and the very people who are loudest in their complaints as to the quality of the gas are the ones who most disregard the method employed for its consumption.

Sir George Livesey, in 1900, pointed out that in fifty cases of complaining customers he had the old burners removed and replaced by new ones, when the complaints at once ceased; and, on testing the burners so removed, it was at once clear that the trouble had been caused entirely by their condition being absolutely unfit for the consumption of illuminating gas. In another case under my own observation, thirty flat-flame burners were collected at random from houses of consumers supplied with town gas. They were mostly union-jet burners. Nos. 3 to 7, and were tested first when consuming 20-candle gas and subsequently with London gas.

With the 20-candle gas, the best of the consumers' burners gave 14·08 candles per 5 cubic feet rate, and the worst gave 4·34 candles. Of the total number of burners 30 per cent. gave less than 7 candles per 5 cubic feet rate; and the average of the whole number made the illuminating value of the gas 8·5 candles, With London gas, the best burner gave 10·6 candles per 5 cubic feet rate, and the worst 3·1 candles. Of the total number, 56 per cent. gave less than 7 candles per 5 cubic feet rate. The actual consumption of the burners supplied with gas under $1\frac{1}{2}$ inches pressure varied from 4·5 to 5 cubic feet per hour, and the consumptions were the same with both kinds of gas.

England is far behind Germany in the use of incandescent lighting; and an inquiry made this spring into the uses to which the coal gas supply of a large town was put gave the following results:—

Incandescent lighting, private	12·00	per cent.
,, ,, public	6·25	,,
Cooking	23·75	,,
Gas-engines and fuel	5·50	,,
Used in other ways	52·50	,,
	100·00	,,

So that 47·5 per cent. is used for purposes in which illuminating power is of no use and calorific effect is the one important factor. It is also seen that 18·25 per cent. of the total gas made is used for incandescent lighting; and this represents about 23 per cent. of the gas employed for illuminating purposes, as against 90 per cent. used in this way in Germany. The 23 per cent. thus used gives, for a consumption of 5 cubic feet, not less than 70 candles; while the average light obtained by the combustion of the remaining 77 per cent. is 8·5 candles. It is quite clear that, under such conditions as these, the supply of gas of a high candle power is simple waste of money; and it is manifestly unfair that the consumer of average intelligence, who is willing to utilize the benefits given by the incandescent mantle, should have to pay for a quality of gas only rendered necessary by the inertia of those who decline to march with the times.

For many years, I have felt and pointed out that the consumer, knowing only that he wants more light, and absolutely ignorant of the principles of gas lighting, clamours for a richer gas, while the remedy is all the time in his own hands; and the only thing he has to do to attain his desire is to employ rational burners. Men like Sir George Livesey, Mr. William Foulis, and Mr. Webber have long since seen the fallacy of high candle power gas, and have fearlessly denounced it. The time has now come when the principle is being widely grasped, and manufacturer and consumer alike are realizing that cheap gas, and plenty of it, gives far greater possibilities and better illumination than high illuminating value gas, which must of necessity cost more, as, in trying to economize by using small burners, the light-giving value is destroyed to such an extent that the effect produced is utterly inadequate to the cost.

The arguments brought forward in favour of high-power gas and its advantages over low-grade gas are, as they always have been, that for a given illumination it is cheaper, fouls the air of a room to a smaller extent, and does not, for an equal illumination, give as much heat. These contentions were to a great extent fallacious even under the old conditions; as, although a 22-candle cannel gas gives 4·4 candles per foot when burnt in a standard flat-flame burner, as against the 3·2 candles yielded by 16-candle gas burnt in the "London" argand, directly they came to be used under ordinary consumers' conditions, there was little to choose between them, while any coign of vantage that cannel gas had entirely disappears under the conditions which now dominate the gas industry, and it is just Sir Edward Frankland's 96 feet of rubbish which make the gas of the future.

Two years ago, Mr. Webber gave a most interesting lecture before the Gas Institute, taking as a title "The New Gas," which turned out to be the low-grade gas so widely used with incandescent mantles and for fuel purposes on the Continent. He pointed out that, freed from the trammels created by the Welsbach monopoly in this country, incandescent lighting had practically displaced all other forms of gas-burner in Germany. There is not the least doubt that, with improvements and cheapening in the production of mantles, the use of coal gas in this way would rapidly rise in this country to the same dimensions as on the Continent.

It will be well at this point to consider the conditions under which gas manufacture at present labours, and the ground it must cover in the future if it is to hold its own. We have not heard so much of late of the working out of our coal supplies; but the fact remains that the best seams of gas coal are getting used up, and coal of this class will soon show an increase in price that will prevent any high quality of gas being made direct from it without a commensurate rise in the cost of gas. All enriching materials, moreover, fluctuate in price with the demand made upon them; so that if the high illuminating value of coal gas is to be maintained, the probabilities all point to a rise, rather than a diminution, in price. Even in calculating the probable saving to be obtained by the introduction of gas of lower illuminating power, this factor ought clearly to be taken into consideration.

A 16-candle coal gas, when consumed with the incandescent mantle, may mean an 80 to 100 candle gas. But the difference, with properly regulated air supply to the burners, between a 16 and a 12 candle gas is so slight as to be undistinguishable to the eye; while the diminution in heating power which accompanies the lowering of the illuminating power, although not sufficient to

make a large difference to the gas for fuel purposes, yet adds to one's comfort in a dwelling room, where, as a rule, the ventilation is none too good.

Coal gas is daily being used more and more as a fuel; and although the slight diminution of calorific value which must of necessity accompany lowering the illuminating value is a slight drawback, yet, in practice, any desired temperature can be attained by a slightly larger consumption. Further, a cheapening of the gas would induce many to adopt it as a fuel—this, in turn, tending to level up the load in production and so render more economies possible.

Everthing clearly points in one direction, and that is that the future of coal gas is entirely dependent upon a plentiful supply of low-grade gas—low grade from the point of view that it shall only have an illuminating value of 10 to 12 candles, that its heating value shall be as high as can be practically attained, and that its price shall be as low as is consistent with the interests of the consumers in the gas industry, as well as with the interests of the shareholders.

Already the stream has set in this direction. The lowering of the parliamentary standard of 16 to 14 candle power in the cases of the South Metropolitan, Commercial, and West Ham Gas Companies will soon be followed by many companies now saddled with a higher standard than 14 candles applying for the relief that cannot be in fairness refused; while experience of the benefits conferred by the reduction will soon lead to the further step that will place gas manufacture in this country on the same advance footing that it has already gained in the most progressive cities in Germany.

When, however, the change from a 16 or higher candle power down to a 14 or lower illuminating value has been sanctioned by Parliament, the gas manager finds himself confronted with the difficulty that his works have been erected and adapted for making the higher value, and all his practical knowledge is in that direction. His first trouble is to find out how this grave problem is to be overcome, and how the low-grade gas can be most economically and best produced; and it is with the solution of this question that I now desire to deal.

In order to find an answer which will be of practical use, it is no good advancing theories and proposing methods which necessitate such wholesale alterations in plant and procedure as would to all intents and purposes mean scrapping the existing generating machinery. The only processes which have a chance of being adopted must be very much on the lines of the old system; and if the plant be altered at all, the alteration must be such as can be made at a reasonable outlay, and without serious disturbance to the ordinary working.

The gas which is produced must be, in all save illuminating value, of the same character as the coal gas of which we know the behaviour, and for the consumption of which our stoves and burners have been constructed—special attention being paid to keeping up the calorific value and keeping down the cost. The logical method of arriving at our result is to first see the composition which would yield ideal results, and to then see what process can be utilized in attaining the nearest approach to this. In order to do so, the first point is the effect of the constituents of gas on the results to be obtained from it.

The great advantages possessed by coal gas over the fuel gases properly so called—water gas, Siemens gas, and the hundred-and-one modifications of them which have been more or less used—consist in the presence of those compounds that we call hydrocarbons; and first and foremost, both in giving size and heating power to the flame, as well as in helping its luminosity, stands methane (CH_4)—a gas which, at various periods in its career, has been better known as marsh gas or light carburetted hydrogen. A natural product of the decompositions which led to the formation of coal from the monster vegetation of prehistoric times, its presence, ready formed in the coal measures, has proved one of the greatest dangers that the winners of our fuel have had to contend with, as, mixed with the air in the workings of a mine, it forms the dread fire-damp that has cost so many lives.

Taking the average composition of an ordinary 16-candle coal gas free from enrichment, we may state it as follows—

Hydrogen	54 per cent.
Methane and hydrocarbons of the same character	34 ,, ,,
Ethylene	3 ,, ,,
Benzene	1 ,, ,,
Carbon monoxide	6 ,, ,,
Nitrogen	2 ,, ,,
	100

All of these, with the exception of the nitrogen, contribute their iota to the heating value of the gas; and their relative value in this direction may be stated as follows:—

Calorific Value in British Thermal Units.

Gas.	Gross.	Net.	Illuminating Value per 5 Cubic Feet.	B.T.U. per Candle.
Hydrogen	325	272	—	—
Methane	1024	919	5·2	312·5
Ethylene	1603	1510	70·0	114·5
Benzene (vapour)	3718	3574	820·0	22·6
Carbon monoxide	330	330	—	—

Applying these thermal values to our coal gas, we obtain—

Hydrogen	54 × 325	=	17,550
Methane	34 × 1024	=	34,816
Ethylene	3 × 1603	=	4,809
Benzene	1 × 3718	=	3,718
Carbon monoxide	6 × 330	=	1,980
			62,873

or 628·73 B.T.U. (gross) per cubic foot, which experience tells us is about the value given by the calorimeter. It is clear from this that more than one-half the calorific value of our coal gas is due to methane, and more than two-thirds to the mixed hydrocarbons; and it is evident that these heat-yielding bodies must be fully represented in our future gas.

The only commercial and attainable sources of such hydrocarbons are found in the destructive distillation of coal and mineral oils; and although the hydrocarbon gases *per se* could probably be obtained most cheaply by the cracking of mineral oils, yet we should then be driven back for the large volume of diluting gas which would be a necessity to lower the illuminating power and cost, to water gas, which, under these circumstances, would be the only available diluent. At once, however, three factors crop up which would immediately negative the use of a low-grade carburetted water gas. These are: (1) That it would forthwith render useless the existing gas plant; (2) that cheap coke being an essential to the manufacture of water gas, the cutting off of the supply of this material would at once render the manufacture of water gas an impossibility at a commercial price; and (3) that blue water gas contains 40 per cent. of carbon monoxide, and that though in 20-candle power carburetted water gas this is reduced to 30 per cent., yet in a 12-candle power mixture it would rise to 35 or 36 per cent., which, under existing circumstances, would never be permitted for a domestic supply.

In order to make our view of the subject as complete as possible, I shall later on deal with the economic side of a gas supply made on these lines; but I have thought it best to state at this point, in a few words, my reasons for considering that it never would be adopted. It is evident, therefore, that coal, and not oil, must be the main factor in producing those hydrocarbons which are to raise the calorific value of the gas to the required point; and we can now discuss the methods by which increased volume and lowered cost can be obtained on this basis.

Among the suggestions made for cheapening the manufacture of gas at the expense of illuminating value, is that higher temperatures would be employed for retorting the coals; but I think the majority of gas managers will agree with me that the useful maximum temperature has been attained, and that any further pushing of the heats would accentuate troubles which have already shown themselves. If the present practice of using temperatures that yield about 10,000 cubic feet per ton of coal were departed from, the first thing that would make itself felt is the fact that only a small portion of the gas coal supply is fitted for use at higher temperatures than those employed; and this limitation would soon tend to raise the price of such kinds of coal as could be used.

In a highly suggestive paper read by Mr. H. E. Jones this year on "The Illuminating Power of Gas of the Future," experiments seem to show that, with a Durham coal, it is possible to increase the yield of gas per ton of coal by something like 25 per cent. with a total increase in calorific value, by increasing the temperature of carbonization and diminishing the pressure in the retort. Working in the same way, I have found results of similar character; but it must be borne in mind that this only means an increase in the volume of gas obtained per ton from 1000 to 1250 cubic feet.

The most complete work ever done on the distillation of coal was by Mr. Lewis T. Wright; and the paper which he read at the May meeting of the Incorporated Institution of Gas Engineers in 1895 will long remain one of the most valuable contributions to the subject of carbonization. In it he showed that, by pushing the temperature at which distillation was taking place, a rise in volume yielded per ton of a Derbyshire caking coal took place with increased heats till a maximum of 12,190 cubic feet per ton was reached, and this gradually fell again; the same thing being observed with other coals.

It seems highly probable that his conclusion is correct, that the more rapid distillation due to pushing the temperature in the retorts would not be attended by any very marked increase in the yield of gas per ton, as the more rapid evolution of gas in the early stages of the charge would hurry the gases out of the retort and so prevent their being broken up by the increased temperature. Indeed, on purely theoretical grounds, it is impossible for increased temperatures to give more than a certain increase in volume, as the chief constituents once formed in the retort, they are so stable with regard to heat, owing to their character and to dilution, that but little extra gas is obtained from them; while in baking the already formed gas, it is only the higher hydrocarbons that, by decomposition, can give any increase, and while some of these are being decomposed to carbon and hydrogen, others are synthetically built up into such bodies as naphthalene.

In a recent experiment made under my direction, a poor coal was retorted at the usual temperature; and after the candle power and calorific value had been determined, samples were taken for analysis. The temperature of the retorts was then

raised as high as they could be got, and fresh determinations were made with the following results:—

	I. Ordinary Temperature.		II. High Temperature.
Hydrogen	51·11	..	54·68
Saturated hydrocarbons	36·39	..	32·32
Unsaturated hydrocarbons	4·50	..	4·00
Carbon monoxide	7·00	..	7·00
Carbon dioxide	nil	..	nil
Oxygen	nil	..	nil
Nitrogen	1·00	..	2·00
	100·00	..	100·00

	Illuminating Value.		Calorific Gross.		Value B. T. U. Net.
I.	15·2	..	612	..	556
II.	14·6	..	596	..	532

Showing that the action taking place was an increase in the volume of hydrogen at the expense of the hydrocarbons present; and where it has been possible to further increase the temperature of carbonization, the action has been still more marked.

If instead of taking a poor coal, as was done in this case, and using the ordinary retort temperature, which gives in the first instance a large amount of hydrogen in the gas, a rich Newcastle coal is taken, and is retorted first at a low temperature (dull red), and is then carbonized at the highest attainable temperature (bright orange), this action is still more striking. As far back as 1884, Mr. Lewis T. Wright made an experiment of this character, with the following results:—

Temperature.	I. Dull Red.		II. Bright Orange.
Hydrogen	38·09	..	48·02
Saturated hydrocarbons	42·72	..	30·70
Unsaturated hydrocarbons	7·55	..	4·51
Carbon monoxide	8·72	..	13·96
Nitrogen	2·92	..	2·81
	100·00	..	100·00
Illuminating value	20·5	..	15·6
Cubic feet per ton	8250	..	12006
Calorific value B. T. U. (calc.)	811·0	..	588·8

Here, again, it is evident that the breaking down of the hydrocarbons into hydrogen and carbon has given the increase in volume; and while there has been an increase in the candles per ton of coal carbonized amounting to 10·3 per cent., the increase in calorific value per ton is only 5·6 per cent.

A large increase of temperature above that at present employed would, moreover, result in such trouble from stoppage of ascension pipes from pitch, and from naphthalene in the service pipes and mains, not to mention the increased quantity of sulphur compounds and the reduction in ammonia and tar, that, leaving out the question of wear and tear and fuel, such a method of increasing the yield could never be successful. There is, however, another phase of the question. By employing inferior coal, bought at a cheaper rate, and retorting it at the highest temperatures found compatible with economical working, the low-grade gas of good calorific value might be got direct; but the economy to be obtained is very small.

The method, however, of obtaining low-grade gas which would be most welcome to the gas manager and would comply with the necessities of the future, would be to in no way alter the working or arrangement of the present plant, to make the same gas as heretofore, and to dilute it down to the required point by a combustible diluent which must be cheap enough to offer sound economical advantages, and yet be of sufficient calorifical value to keep up the heating power of the mixture to the needed point.

The only gaseous mixtures which are available for this purpose are either water gas pure and simple, or mixtures containing water gas as their basis; and a glance at the calorific values of the so-called fuel gases makes this at once apparent.

Water gas	328 gross
Producer gas	79 ,,
Dowson gas	150 ,,
Mond gas	155 ,,

Indeed, with the exception of water gas, the so-called fuel gases, containing about two-thirds of their volume of inert nitrogen and being of high specific gravity as compared with coal gas, do not lend themselves to distribution.

Blue water gas, as it is customary to call the non-luminous mixture of hydrogen and carbon monoxide generated by the action of steam on incandescent carbon, first made its appearance in this country on a manufacturing scale in 1887-8, as a fuel where high local temperatures were necessary; and shortly afterwards carburetted water gas—a mixture of water and oil gas—was introduced at Beckton as an enricher of coal gas in place of cannel coal, which had at that time risen to prohibitive prices. The ease and rapidity of manufacture at once secured it a complete success; and at the present time very few large gas-works are without this valuable auxiliary.

The attitude of the public towards this new introduction was at first one of apathy. But presently the gentlemen who delight in writing to the daily papers and seeing their names in print, recognized a golden opportunity for self-advertisement; and the public were informed that death and every form of horror were being let loose upon them. The exaggerated, and mostly utterly false, statements of the early agitators being to an extent supported by well-known and well-meaning medical practitioners (who had plenty of book-lore and little or no experience of the subject), a crusade against water gas was started, which culminated in 1898 in the appointment of a Departmental Committee to inquire into the subject. Their report was issued in 1899; and it is probable that some legislation on the subject will shortly be brought forward.

Now, the facts with regard to water gas are these: Made by passing steam over incandescent coke or anthracite, it has an average composition of:

Hydrogen	52 per cent.
Carbon monoxide	38 ,,
Carbon dioxide	5 ,,
Oxygen	1 ,,
Nitrogen	4 ,,
	100 ,,

and it is the 38 per cent. of carbon monoxide that has roused the storm of angry criticism.

Carbon monoxide, or carbonic oxide—the name by which it used to be more generally known—is a virulent poison, and when inhaled in even small quantity causes death by combining with the blood and gradually cutting off the oxygen normally supplied to the body by the blood. Even so small an amount as 0·4 per cent. of carbon monoxide in the air will produce death if inhaled for over an hour; while 0·5 per cent. will only cause headache and giddiness, however long the mixture may be inhaled. So that air containing more than 4 parts in 1000 is fatally poisonous, and air containing less than 5 parts in 10,000 is practically harmless.

Now, this sounds alarming enough, and bears out the contentions of the opponents of water gas; but the points overlooked by them are that, in an ordinary sized room, it is very difficult to even purposely make a fatally poisonous mixture of air and the gas, and, secondly, that blue water gas, with its 38 per cent. of carbon monoxide is not distributed as a domestic supply. In order to give luminosity, the otherwise non-luminous water gas is made to pass through chambers of heated chequer-work, into which a thin stream or spray of petroleum is injected; and the oil being gasified by the hot brickwork into oil gas, mingles with the hot water gas. The mixture is then fixed—that is, any oil remaining as vapour being converted into permanent gas by passage through another heating chamber—and the now highly illuminating mixture is known as carburetted water gas.

The composition of the mixture will, of course, vary with the proportion of oil gas mixed with the water gas; but the quality most used for enriching coal gas is from 20 to 22 candle gas, and has the approximate composition:

Hydrogen	37·20 per cent.
Saturated hycrocarbons	18·88 ,,
Unsaturated hydrocarbons	12·82 ,,
Carbon monoxide	28·26 ,,
Carbon dioxide	0·14 ,,
Oxygen	0·06 ,,
Nitrogen	2·64 ,,
	100·00

So that the dilution of the water gas by oil gas reduces the percentage of carbon monoxide to 28·2; but with the exception of a short period in one of the divisions of Liverpool, carburetted water gas alone has never been distributed in this country, though in America 296 of the largest companies send it out as a domestic supply.

In Great Britain, it is almost entirely used to enrich and augment the supply of coal gas; and the amount added depends largely upon local circumstances. The following table shows the maximum and average percentages put into the coal gas in some of the more important towns:—

Town.	Maximum. Per Cent.	Average Per Cent.	Town.	Maximum. Per Cent.	Average Per Cent.
Bath	40	10	London (North of the Thames)	20—25	
Belfast	50	30	Middlesbrough	33	
Birkenhead	64	36	Norwich	56	
Birmingham	24		Preston	50	30
Blackburn	33		Southend	45	
Bridlington		25	Southport	26	
Brighton	42·79	22·25	Swansea	25	
Colchester	20		Taunton	40	
Coventry	44	28	Tottenham	50	
Hastings	33		Winchester	30	
Hornsey	36				
Liverpool	50				

So that, under ordinary conditions of working, it is safe to say that 20 to 50 per cent. of carburetted water gas is added to the coal gas supply. The whole question of what quantity shall be permitted hinges on the percentage of carbon monoxide present in the mixture; and this should be kept down to a point that should prevent such small leakages as are possible in a dwelling room from being actively injurious or endangering life.

It must be remembered that coal gas itself contains a certain proportion of carbon monoxide; the quantity being dependent upon the composition of the coal and upon the conditions of temperature and exhaust in the retorts. It has been found that the presence of combined oxygen in coal gives rise during carbonization to the formation of oxides of carbon; and M. St. Claire

Déville, from a long series of experiments on 59 different kinds of coal, established the following relations:—

In Coal Oxygen.	In Gas. Carbon dioxide.	Carbon monoxide.
5 to 6·5 per cent.	1·47 per cent.	6·68 per cent.
6·5 to 7·5 ,,	1·58 ,,	7·19 ,,
7·5 to 9 ,,	1·72 ,,	8·21 ,,
9 to 11 ,,	2·79 ,,	9·86 ,,
11 to 12 ,,	3·13 ,,	11·93 ,,

The presence of the oxygen also in large percentage in the coal generally means a high yield of volatile hydrocarbons—hence a gas of high illuminating power; but such coals are rather avoided by the gas manager, as they are high in price and ruin his coke. High retort temperatures also seem to have an effect in increasing the percentage of carbon monoxide; and in the analysis of gas by Mr. Lewis T. Wright already quoted, it will be seen that, whereas a Derbyshire caking coal yielded 8·72 per cent. of carbon monoxide when distilled at a dull red heat, the same coal yielded 13·96 per cent. of this gas at a bright orange heat. A heavy exhaust would also tend in the same direction, as any trace of air leaking into the retort would form the monoxide. With the coals most used, however, from the Newcastle and Durham districts, the average amount of carbon monoxide rarely exceeds 4 to 5 per cent.; and it is now possible to gain an idea of the quantity that might with safety be allowed in the mixtures sent out as illuminating gas.

There is no danger of poisoning by such mixtures during the day time, as the smell of the gas attracts attention to the danger long before the gas reaches a serious proportion; nor is it of any use considering the cases of large leaks, as from broken mains or torn-down fittings, as there would always be the risk of fatal results whether the gas was coal gas only or a mixture of coal and water gas. The real risk is during sleep, from such escapes as might be produced by leaky joints or partly re-turning a loose tap when putting out the gas. Such a leak would practically never be a serious one, as, if it were, it would be detected before the occupant of the room could get to sleep.

My own view is that practical safety is assured as long as the amount of carbon monoxide in the gas supply does not exceed from 16 to 17 per cent. In the Departmental Committee's report, they recommend "that the proportion of carbon monoxide in the public gas supply at night should be regulated to 12 per cent., or such greater amount as the Department may consider desirable;" and in the body of their report, they say: "In some cases, 12 per cent. of carbon monoxide in the gas supplied might be proper, in others 16 or perhaps 20. . . . With the present conditions of gas supply, 20 per cent. is the highest proportion of carbon monoxide that should be allowed, and that this percentage should be used only under special circumstances."

The views of the authorities in London are that the amount of carbon monoxide in the gas distributed should not exceed 16 per cent., and the Legislature is always so chary of doing anything to unnecessarily hamper a great industry, that the limit is not likely to be fixed below this point—indeed, as coal gas *per se* may contain up to 12 per cent., fixing anything lower than 16 would be practically prohibiting the use of a valuable adjunct to gas manufacture. Taking, for the sake of calculation, the allowable limit as 16 per cent., this would mean that an ordinary coal gas containing 5 per cent. of carbon monoxide might have its bulk increased by carburetted water gas until the mixture contained 52 per cent. of coal gas and 48 per cent. of carburetted water gas; while if blue water gas were used, the limit would be reached when the mixture contained 66 per cent. of coal gas to 34 per cent. of blue water gas. In other words, to 100 volumes of coal gas, one might add 92 volumes of carburetted water gas, or 51·5 volumes of blue water gas, before reaching the limit of 16 per cent. of carbon monoxide in the mixture. The bearing of these figures will become apparent when considering the factors that must govern the production of low-grade gas.

MANCHESTER AND DISTRICT JUNIOR GAS ASSOCIATION.

The Opening Sessional Meeting of this Association was held on Saturday at the new Manchester School of Technology. The members assembled in the afternoon at the school, and, by permission of the Principal (Mr. J. H. Reynolds) were conducted through the various departments, which are now completely fitted up with modern appliances, tools, and machinery suitable for technical training in various branches of industry. The visit was one of exceptional interest. In the evening the members met in one of the lecture-rooms, which was placed at their disposal.

The PRESIDENT (Mr. S. E. Halliwell, of Littleborough) occupied the chair at the commencement; but he was unable to remain during the proceedings. There was a fairly good attendance.

The PRESIDENT, in opening the meeting, said the Council had been fortunate in securing the services of Mr. S. Tagg, who had undertaken to prepare a paper as the first for their winter session. The subject he had selected—"Efficiency in Gas Manufacture"—was of wide scope, and should lead to a good discussion.

Mr. GARLICK, in taking the chair vacated by Mr. Halliwell, said from what he knew of Mr. Tagg, he had special faculty for expressing himself in a way that everyone could understand, and he was sure they would have a very interesting paper.

Mr. S. TAGG, of the Birkenhead Gas-Works, then read the following paper:—

EFFICIENCY IN GAS MANUFACTURE.

The recent cry for efficiency in our public services, raised in so forcible a manner, and echoed with unmistakable sincerity, is of such importance, and so equally applicable to all manner of work, at this or any other period, that I feel an attempt to gauge the position of, and achievements in, gas manufacture may not prove unprofitable. The peculiar nature of the gas industry renders appropriate the question: "Are we generally employing the best methods and obtaining the highest results?" For any undertaking to receive the hall mark of efficiency, implies in its direct control a combination of the far-seeing and judicial qualities of the engineer, the analytical and resourceful initiative of the chemist, and the insight and keen grip of the business man. Though most undertakings are met with the competition of electric light, this rivalry is generally not sufficiently severe to really impair the position of monopoly so long enjoyed by our industry. And it is against the possibility of lethargy created by these circumstances that we must resolutely set our faces; finding in the success of our work that incentive to renewed efforts that the law of demand and supply usually creates.

The obvious differences that exist in the working results of various concerns, are doubtless largely due to the factors governed by local conditions; but we are, I think, entitled to ask ourselves whether a complacent faith in "local conditions" might not sometimes be replaced by careful inquiry and patient effort. To dogmatize upon the lines of thought and methods of action necessary to ensure the efficiency of the department or undertaking within our care, would be as futile as it would be unwarrantable. But we may be enabled to more correctly estimate and possibly increase the efficiency of the works we are interested in by examining some of the main principles which should govern us, and by endeavouring to apply these to the several departments of a works. The extent of our technical or scientific training must affect our capacity for the successful conduct of works. It is impossible to properly approach the problems we are confronted with, without a knowledge of the scientific principles involved. I will not attempt to define the subjects that should be included in our course of study. The field covered by the requirements of our profession is limited only by the standard we choose to set ourselves. We must recognize, from consideration of time alone, that it is hopeless to attempt to master in the highest degree the whole of the science involved in gas engineering. We must therefore realize our limitations, and select what is possible to accomplish.

We must endeavour to systematically study the fundamental principles of each branch of science we undertake. Education does not consist of an accumulation of isolated facts—indeed, such accumulation is more likely to cause mental indigestion and retard, instead of assisting the exercise of mother wit. With a thorough basis of principles, experience will soon develop methods of effective initiative in our work. Before we commence to apply our scientific knowledge, we must hold clear conceptions of the field we are engaged in. Gas engineering may be defined as the control of a manufacturing concern, which requires a technical and scientific training, but whose basis is a commercial one. Thus, economy in manufacture must always be the vital question with us; and the tendency existing among those who have specialized upon one of the several departments of gas engineering to view the whole duties from a localized standpoint, and in the beauty of a process or the excellence of a design overlook their efficiency or economy, must be guarded against.

It must be granted that the attainment of a high professional standard makes no mean demand upon the capacity and abilities of those entering its ranks. We hear sometimes the statement that the profession is not recruited from the class of men best able to maintain and increase its prestige. The remedy is to increase the prospect of adequate remuneration for services as chief or responsible assistant; and it must be admitted that the degree of ability demanded by our work has been recognized more fully by those engaged in it than it has by those in authority. It is a great mistake to under-staff any works run on commercial lines. The total cost of crude materials and unskilled labour employed in the manufacture of coal gas may be taken approximately at 1s. 9d. to 2s. per 1000 cubic feet made; while the average cost of trained and skilled labour to supervise same varies from 0·25d. to 0·5d. per 1000 cubic feet. The difference between actual and possible results if adequate scientific supervision were employed, is sometimes sufficiently great to justify an expenditure of double the latter figure. Efficiency of manufacture is largely dependent upon the existing condition of works, as regards convenient planning and proportioning of apparatus; and all extensions should, wherever possible, form part of a general scheme based upon optimistic estimates of the possibilities of the concern. All alterations to mains or apparatus should be at once correctly recorded on works plans; giving all information regarding cover, &c., of mains.

Before considering manufacture, a word should be given to the selection and valuation of the raw material. The choice of coals is largely determined by the geographical position of the works; and knowledge as to the various qualities mined in any

particular district is becoming still more definite. Considerable variations in the quality may, however, occur, even in different portions of the same seam; and where several coals are carbonized, it is necessary to test all, to detect the cause of inferior results. For this purpose, I think the small plant taking 2 lbs. of coal per charge possesses advantages over the isolated retort or bed of retorts. It is recognized that, with the small plant, higher results are obtained than in actual practice; but they are strictly comparable, and afford valuable indication of the properties of the coal under test. Indeed, if the plant be proportioned to the works plant, the higher figure may serve as a standard to be aimed at by the carbonizer. The chief source of error with a plant of this size lies in careless sampling. If, however, (say) 2 cwt. of coal is taken as a sample, broken coarsely, mixed and halved, one portion being further broken and divided, and so on until about 30 lbs. remain, the results may be relied upon. The proximate analysis of coal should also be made, as the knowledge of percentage of sulphur and ash is necessary for complete valuation. The whole of the coals received into the works should, therefore, be fully tested at frequent intervals; and the manufacturer will thus be able to satisfy himself as to the quality he is receiving. There is no doubt that coals not generally sold for gas-making purposes may be of service; and if this was shown by analysis, the smaller works in particular would benefit by their use. We have, indeed, the striking example of a works selling gas at a very low figure, produced from a lower grade coal or slack obtained at a cheap rate.

The superiority of regenerative over the direct system of heating retorts is now firmly established; but all methods of regeneration are not equally good. In the simple form with two parallel flues, divided horizontally, guiding the current of both waste gases and secondary air in alternate transverse directions, attention must be given to the liability of short circuiting, due chiefly to unequal settlement of the beds. The weight of hydraulic and secondary mains, when supported solely upon divisional walls of benches, may cause considerable sinking if the foundations are not sufficiently secure, or if, as sometimes occurs, the heat from the beds dries the subsoil below the concrete. The use of rebated tiles in the vertical and horizontal walls of parallel flues will assist in keeping them tight, and render the work of pointing easier should the joints open. The blocks of the Klönne type are better designed, and reduce the risk of short circuiting, for waste gases and secondary air passages are formed in the same block—the waste gases passing directly downwards, while the secondary air passes in a horizontal direction, alternately reversed, through the same blocks. The thickness of fire-clay separating vertical and horizontal openings does not exceed $1\frac{1}{4}$ inches, as against (say) 3 inches in the parallel flue system; and the exchange of heat is consequently more rapid.

In the simpler form of regenerator, the length of travel for the waste gases and secondary air may be so great that, with the regulator on the air-inlet fully open, unconsumed producer gas passes away; and I have seen beds of this type where the sight-boxes on the upper flues were removed to obtain sufficient air for the required heats. Provided the foundation is good, and the work has been well built, the regenerator may reasonably have a life of fifteen years; and ample provision must therefore be made for removing accumulations of flue dust. The life of the upper portion of the bed depends upon the condition of the retorts; and with machine-made clay retorts, 3 years' constant work may be regarded as satisfactory. The life may be prolonged by increasing the number of cross walls supporting the retorts; and with $4\frac{1}{2}$-inch walls the spaces should not exceed 9 inches. There are, I believe, beds with 9-inch cross walls and 9-inch spaces giving excellent results; the heats being equally maintained throughout the length of retorts. An increase in the number or thickness of cross walls reduces the available space for the combustion of producer gas, and a sufficiently large combustion chamber must be designed to allow of complete oxidation before the gases leave the upper portion of the setting.

The majority of regenerator settings were originally designed with two furnaces. Recent experience, however, has proved that the beds are as efficiently heated with one; and the saving effected in furnace fittings and labour in feeding and clinkering, decides the one-furnace type as distinctly the better. The outside producer makes little headway; and its economy is problematical. But in view of the relation between area of primary air inlet and grate surface usually provided in the internal producer, it is probable that they are not worked to their maximum capacity, but might serve for heating two beds. Considerable divergence of practice exists in the use of steam for furnaces. Its effect in breaking up clinker and reducing the intense zone of heat is recognized; but this is sufficiently accomplished by evaporation of water used for cooling dead plates and fire-bars.

To ascertain work done by beds, a careful record of fuel used should be kept. Frequent analysis of waste gases should also be made, and the control of dampers strictly guarded. The life in days, or coal carbonized, of retorts should be booked, with the number of times they are lit up and let down, with remarks as to occasions of scurfing. The section of retort adopted throughout the country does not vary greatly, and is governed by its suitability for charging machinery. Built-up retorts are rarely used; but the ease with which they are repaired, and their longer life, must go far to justify the higher first cost. With through retorts provided with two ascension-pipes, it frequently happens that one of these is choked. The logical conclusion is, therefore, to provide one outlet only, saving half the usual cost of ascension pipes and mains; or, if the reduction in illuminating power consequent upon the increased travel of gas in the retort be feared, to stop the retorts in the centre and provide the usual two sets of ascension-pipes, &c. The trouble of stopped pipes appears inseparable from high heats; but considerable relief may be obtained by increasing the length of mouthpiece—removing the pipes from the effect of radiant heat from the bench.

The question of adequately staying the beds is an important one, and one on which the practice varies to some extent. It is obviously impossible to prevent the expansion of brickwork; and we can only restrict the direction and effect of the movement. I recently saw beds erected without any cross-stays; the engineer allowing expansion to take place until such time as repairs were imperative. This appears to me to be a mistake; for, apart from the support to the mouthpieces given by the cross-stays, the retorts must in time develop such cracks as would necessitate renewal earlier than would have otherwise been the case. The expansion of regenerative beds is not as great below the floor line, and the provision of cross-stays might therefore not be considered so necessary. But it must be remembered that if the movement be less, the expected life of this portion of the setting is some five times greater than the upper, and the conclusion drawn from a recent inspection of unstayed furnace fronts is that it is a mistaken policy. Mild steel or wrought iron should always be used for main and cross stays, in preference to cast iron. If in the design of a stage-floor house the girders carrying the working floor rest upon the main buck-stays, the latter must be sufficiently strong to resist the expansion of the beds, or provision made that any movement is not communicated to the cross girders, and on to the retort-house walls.

It appears better to carry the hydraulic and secondary mains from the main buck-stays than to support them from the cross walls of benches. It is absolutely necessary for efficient carbonization to maintain a light and equal seal in the hydraulic main; and this is easier effected if the latter is carried from the buck-stays. These should have ample area at the base, with solid foundations under. It is useless to expect good results, either yield or quality, from retorts whose seal may vary from 1 to 3 inches—a range which is by no means hypothetical. The prevalence of "steamers," due to excessive pressure, should not exist. The seal maintained should be just sufficient to prevent the liability of gas backing through an open mouthpiece or into an empty bed. Undue seal may easily make a difference of 500 cubic feet per ton of coal; and having been fortunate in my experiences of anti-dips, it has often been a matter of surprise why they are not more generally adopted. They have proved absolutely safe to work, they avoid the evils of heavy seals, and, though greater care is necessary to prevent excessive pull on the retort, with the use of a modern type of exhauster and strict attention on the part of the engine man little risk should be run. But with anti-dip or lightly sealed dip pipes, the vacuum maintained is of great importance; and sensitive gauges should be fixed both in the retort and exhauster houses, and the services to both examined with frequent regularity.

I may perhaps be permitted to digress and emphasize the necessity both of a plentiful supply of gauges on a works and of constant attention to gauges and services; so that the utmost reliance may be placed on the readings. Gauges are the eyes of a works; they are the only indication we possess of what is occurring in a buried main. Their condition forms a criterion of the care manufacture is receiving; and many serious stoppages would be foreseen and prevented if requisite provision, attention, and observation were given.

To return to the retort-house, the hydraulic main should be adjusted for level at least every season, and the utmost care taken to obtain an equal seal. A $\frac{3}{8}$-inch plug tapped into the mouthpiece, to be occasionally removed, is a convenient device for determining the pressure within the retort, due either to a heavy seal or choked ascension-pipe. The style of hydraulic main materially affects the formation of thick tar. My experience is that, with a main of the section of a quarter-circle, working with a light liquor seal, no trouble is found; and such mains have run throughout a whole season without requiring the tar-valves to be opened. A main of U section that had given trouble from accumulations of thick tar, was altered to a quarter-circle by filling the bottom with concrete, and no further difficulty was experienced. Every bed should have a separate hydraulic main, with valve on the inlet to the secondary main, enabling each section to be completely cut off when the bed is out of work. The further precaution of plugging up the inlet to the ascension-pipes in the retort-mouthpieces is also advisable.

Where the use of cannel as an enricher still continues, it is worth while considering whether greater efficiency would not be obtained by carbonizing in separate retorts. The best grade yields the greatest sperm value with low makes; thus differing from coals where the greatest sperm value accompanies the higher makes. The inferior coke from cannel would come from the retort-house unmixed with the better coke from coal; and there might be some difficulty in disposing of it. As a set off, however, the bulk of the coke would be of greater value, containing less ash—an important factor if used for the manufacture of carburetted water gas. And a word now against the practice of allowing a thick accumulation of carbon in the retorts. Their capacity

is materially reduced, the heat of the setting carried unnecessarily high, and the life of the retorts shortened, by the vigorous use of scurfing bars required to remove an incrustation some 3 or 4 inches thick. A more economical plan is to carry a spare bed under fire, and every five or six weeks put each bed off in turn for 24 or 48 hours, until the carbon is sufficiently loose to be easily detached.

The economy effected by the adoption of power machines for charging and drawing retorts obviously depends upon the number of retorts and the period for which they are in full use. Manual machines can be introduced into retort-houses of much less size than those suitable for power; and in considering the relative advantages of the two systems, the estimated saving to be gained by the adoption of power machines must be most clearly established to warrant the heavier capital expenditure. Coke-handling machinery is coming more into use, and may, under certain conditions, serve a useful purpose. The breakage of the coke, heavy wear and tear on all moving parts, and total derangement of carbonization caused by a breakdown of elevators, conveyors, or screens, constitute, however, serious drawbacks to extensive installations; and I am confident that it is an easy matter to "over machine" this portion of a works. Inclined retorts are a thorny subject, on which I shall say no more than that, in my humble opinion, the system has not yet passed the experimental stage.

The first step in purification—viz., condensation—is generally effected by atmospheric condensers, either horizontal or vertical. The accepted principles in both types are those of slowly cooling the gas, and causing the condensed products to flow in the same direction; but adherents to the opposite methods are found. The effect of condensation on the illuminating power is one that could be well investigated by the members of this Association; any serious diminution would be shown in the reducing of hydrocarbons absorbed by bromine. Condensers should, as far as possible, be shielded from the direct rays of the sun; and the Continental practice of enclosing them with the scrubbers in a house, although costly, facilitates the maintenance of desired temperatures. The design of condensers should permit of a section being shut off without reducing the area of flow. The comparative duty of tower and machine-driven washer scrubbers is not easy to exactly determine. The rate of flow of liquor through the former cannot be accurately measured; but frequent tests on the inlet and outlet liquor, and analysis of the inlet and outlet gas to determine the impurities retained, should decide us as to their efficiency. It would also afford information as to the economical point of working the liquor, and of the necessity for refilling the scrubbers. The amount of clean water admitted to the final scrubber or washer should never exceed that sufficient for the complete extraction of ammonia.

The arrangement of tar and liquor wells and cisterns should be simply planned, with the requisite number of pumps. The liability to accumulations of gas in the tar and liquor wells must not be overlooked. Purification proper may be required to effect: (*a*) Removal of sulphuretted hydrogen, (*b*) removal of sulphuretted hydrogen and carbon dioxide, or (*c*) sulphuretted hydrogen, carbon dioxide, and sulphur compounds other than sulphuretted hydrogen. The removal of sulphuretted hydrogen and carbon dioxide, either by lime or oxide of iron and lime, presents little difficulty; and the only factors to ensure efficiency are properly designed boxes and suitable materials. The area of boxes must be carefully considered. If these are too small, the purifying material and labour is wasted; while if too large, a portion of the first cost is unproductive. If lime only is used, the danger of insufficient area is greater, as the passage of sulphuretted hydrogen may require a box to be thrown out of action, while still actively taking up carbon dioxide. If sulphur compounds other than sulphuretted hydrogen are extracted, the process is more complicated; and the necessity for conforming to the Act overweighs the question of cost. Where oxide is used, the material should be tested for sulphur after every change, so that the work performed may be accurately known.

Few works have ventured upon plant for the extraction of cyanogen; and those that employ oxide only for purification may, with care, realize the value of cyanogen in their spent oxide. The attention given by German chemists to this question is worthy of notice. Though carbon dioxide is usually removed from gas, the resultant increase in illuminating power is not as great as often assumed. Instead of 1 candle for 1 per cent. of carbon dioxide, I think half-a-candle is nearer the mark. Storage room for lime should be sufficient for proper slaking and cooling before use. The economy of well-designed overhead purifiers, with necessary elevators, over the ground-floor type is, I think, well established. A complete record of the purifying work, giving the length of time the box was in work, the quantity of gas passed, the temperature, and the percentage of impurities present at the inlet and outlet, should always be kept.

The engine and boiler practice of many gas-works does not reach a mechanical engineer's standard of efficiency. We too frequently see leaking steam joints, badly packed glands, play in engine main bearings, exhaust steam passing directly away, and cold feed supply to boilers. These conditions arise from want of surplus power in boilers, engines, and pumps, and from insufficient attention to repairs. The number of engines and self-contained pumps used on a works is very considerable, and an ample mechanical staff should be retained. The Lancashire boiler is almost universally employed on gas-works. But such large steam users as central electrical generating stations have generally adopted boilers of the water-tube type; and their economy in ground space should justify consideration under certain conditions. Attention should also be given to the advantages of economizers and exhaust steam feed-water heaters; the latter being certainly better than the use of live steam for this purpose, as I recently saw on a works. The attempt to determine the duty obtained from works boilers is rarely made. The fuel is not weighed, or feed-water measured; and though possible economies in these directions may appear small, it must, I think, be conceded that no efficient system neglects trifles.

A well-designed chemical laboratory is essential to a properly equipped works. It is too important to be hidden in an obscure corner of the works, but should be conveniently placed to allow of services being run from each section of the plant, and to facilitate the general control of all processes. Provision should be made in separate rooms for (*a*) coal-testing plant; (*b*) general analytical work; (*c*) balances, the more delicate apparatus, and analyses; (*d*) photometer, Referees' sulphur test, jet photometers, &c.; and (*e*) office for writing up results. The routine work should consist of relentless periodical analyses of coal and cannel; crude and purified gas for ammonia, hydrocarbons, sulphuretted hydrogen, other sulphur compounds, and carbon dioxide; and lime and oxide. As much information as modern analytical chemistry can impart on the manufacture and purification of gas should be obtained, and all results carefully recorded. The quantity of raw materials is as important as their quality, and we should hardly think of receiving coal, &c., without checking the invoiced weights.

Collect and tabulate your data. Its application may not at all times be apparent; but a more complete knowledge of the functions and capacity of the plant must prove of incalculable value in determining its efficiency. It must have occurred to all engaged in the design of a works that the existing data regarding the area and capacity of condensers, scrubbers, washers, and purifiers is inadequate. We have been content to be guided by empirical rules, instead of conducting scientific research on which to base principles of design. Governors and meters are sufficiently automatic in their action to require little attention; but it must not be assumed that they require none. I recently heard of a governor loaded and unloaded every day for years, until it was discovered that the bye-pass valve had never been closed since it was fixed; and the alteration of the water-line of a station meter, giving a healthier appearance to carbonizing returns, is not absolutely unheard of. The care demanded by gasholders consists chiefly of painting, which should not be neglected, and of oiling and possibly adjusting guide-pulleys. The manufacture of carburetted water gas has not been touched upon, as not possibly possessing the general interest attaching to coal gas. A log book, giving full particulars as to date and nature of repairs to apparatus, should be kept, so that the life of any section of the plant may always be conveniently referred to.

A very important care of the works manager is the economical disposal of labour. Working costs are largely affected by the capacity of control; and as the men may be called upon to put forth an extra effort to meet an emergency, judicious supervision is necessary to create a willing spirit. Regularity of method should be dominant. Valves should frequently be inspected and oiled, that they may open or close without difficulty when required; and syphons should have special attention. The works should be planned to afford ample room for all operations, avoiding (say) the unnecessary moving of temporarily excavated material, and permitting the holding of sufficient stock of materials for all purposes. An orderly works is significant of an orderly controlling mind, and is conducive to carefulness and freedom from waste in many directions. The cost of the various processes should be accurately analyzed and calculated per 1000 cubic feet. The whole of the work should be so systematized that the chief has a complete check on all operations, and the different portions of the apparatus under such sensitive scientific control that his decisions may be rapidly carried into effect and ensure the maintenance of the highest possible efficiency.

Discussion.

The CHAIRMAN (Mr. Garlick) said, as he had anticipated, Mr. Tagg had provided them with a very interesting and valuable paper; and the matter was now open for discussion.

Mr. SHADBOLT said that, as a visitor, he had been not only much pleased but greatly edified by the paper. One thing which struck him was the importance attached to the careful analysis of coal used for gas making, attention to which was most essential. The next point was as to the use of steam for regenerative retorts. Many people, after using steam, had given it up. He had found the use of exhaust steam to be of considerable advantage, and it had a great effect upon the efficiency of ordinary regenerative retorts. Then as to the use of syphons. His experience was that they were liable to get water-logged. Lime might be used over again by being properly burned, at a small cost. He also thought the waste fuel in gas-works might be more largely employed for steam purposes if they adopted forced-draught furnaces. Carburetted water gas had been practically passed over by the reader of the paper; but it was a great blessing to gas managers where works were congested, not only on account of the saving of time in the erection of additional plant, but the rapidity with which the apparatus could be brought into productive operation.

Mr. THORPE remarked that the first portion of the paper, in which the reader was urging the importance of the principles of efficiency, ought to go home to every member of the Association. The question of management was also of great importance; and this involved, as was pointed out, the allied one of remuneration, which all those who had anything to do with securing proper efficiency very well knew.

Mr. TIPTON thought that in small works it would scarcely be possible for the manager himself to carry out all the various tests referred to by the reader of the paper. He considered that automatic recorders would do all that was necessary under such circumstances. The idea of tabulating all the results was, however, a very excellent one.

Mr. SMITH said he could bear out what had been stated with regard to testing, especially in small retorts. In making their contracts for coal, every particular sample could in this way be readily tested, and the results tabulated on a simple plan; and then the coal could be afterwards tried in the larger plant, and comparisons made. The testing of the gas at the washers and the scrubbers was also a very proper thing to do. As to water gas, the extra cost of production in the North of England, where coal was cheap, outweighed, to his mind, any advantage it might have over coal gas production.

Mr. STODDARD thought that blue unenriched water gas might be used with economy for generating steam in the boilers.

Mr. TEASDALE did not agree with Mr. Tagg that inclined retorts were only in the experimental stage. At Salford they erected a bench of these retorts in 1893, a second bench was built in 1896, and now they were putting up a third. They had had no trouble whatever; and so far as Salford was concerned, they were not in the experimental stage.

Mr. MOTTRAM said, with regard to raising steam, they simply swept up the yard, and by employing forced-draught this waste fuel proved amply sufficient. As to using steam for regenerative retorts, he put it through the last regenerative flue, and this had acted very well indeed.

Mr. WELLENS had been very much interested in the paper, and had picked up one or two points he should act upon. The periodical testing of coal was very important; and he was decidedly in favour of having gauges all over the works, and also of having pressure-registers. They had used inclined retorts for four years, and they had given entire satisfaction. He certainly thought they had passed the experimental stage, and were the retorts of the future.

Mr. NUTTALL remarked that he would have been glad if some suggestions had been made in the paper as to the course of study a young gas engineer should go through in order to become thoroughly efficient. In testing, he would prefer to take 16 lbs. of coal for the test.

The CHAIRMAN, in closing the discussion, remarked that Mr. Tagg had dealt very lucidly with the subject he had selected. By means of these lectures, many of the members had been well posted. They were there to help one another, and papers of the stamp of the one which had just been read were what they required in the Association. With regard to the comparative cost of labour and material, and of the management which had to provide the brain power to make the works successful, they would frequently find how lamentably little it was thought necessary to pay the engineering staff. This was a matter which he thought might be taken up and dealt with more prominently than it had been. As to the proper attention to be paid to plant, this was a most important matter. He would like to know whether there was not some cure for carbon deposit in retorts. Another point was the question of the illuminating power of gas. Complaints were frequently made by users when the illuminating power happened to be highest—while, on the other hand, when it was really low, there were no complaints at all. It was a question whether they were not sometimes making gas too good for ordinary purposes. [Some of the members here suggested that the real difficulty was that the burners were not suitable for the enriched gas.] There was also great scope for more suitable fittings than those now largely in use. They could not be too careful with regard to details.

Mr. TAGG, in reply, reiterated his preference for the 2 lb. test mentioned in his paper, as it afforded facilities for testing which were a great advantage. He agreed that it was possible to use lime again after thorough reburning; but the advantage was governed by the first cost at which they could obtain the lime. The remuneration for skilled service was an important question, as the interests of a firm would be the best developed by a competent staff. He did not suggest that managers of small works should be called upon to do all that he had laid down in his paper as essential, when a larger staff could be employed in more important works. He thought there was very little economy to be gained from the use of blue water gas for raising steam. As to inclined retorts, his own experience had not been so satisfactory as that of one or two of the members. With regard to economy in steam production, he considered the question of forced draught should receive more attention. He did not think it was possible to prevent the deposit of carbon in retorts.

Mr. WELLENS moved a vote of thanks to Mr. Tagg for his very excellent paper, and said he would take means to provide every member with a copy.

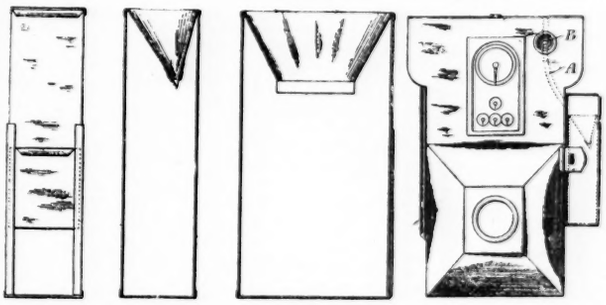
Mr. SMITH seconded the motion.

The vote having been heartily accorded, the proceedings closed.

REGISTER OF PATENTS.

Collecting Coins from Gas-Meters.—Gorman, R., and Tully, C., of Sligo. No. 24,861; Dec. 6, 1901.

The objects of this invention are to facilitate the removal and collection of coin from automatic gas-meters, and to provide an additional safeguard against theft and a check upon the man collecting the money. The arrangement was referred to in a paper by Mr. Tully read at the last meeting of the Irish Association—*ante*, p. 496.



The removeable receptacle or box shown in the engraving has its top formed with downwardly convergent walls (funnel-shaped) and terminating at their inner ends in an orifice of suitable size and dimensions for the admission to the interior of the box of a coin suitable for freeing the mechanism. Lips of india-rubber or other suitable material are attached to the lower portions of the walls, so as to bear against each other and thereby increase the security against the withdrawal of coins from the box. To enable the box to be emptied, it has an opening furnished with a door or lid, secured, when closed, by a sealing device.

A meter is shown provided with such a box with its top just below the outlet of a coin-shoot A leading from the coin-rotating device B. It has a hinged door provided with a staple and hasp so as to be secured by a padlock.

Gas-Condensers.—Carpenter, C. C., South Metropolitan Gas Company, Old Kent Road. No. 19,019; Aug. 29, 1902.

This invention relates to the arrangement of, and mode of working, appliances used for the extraction of condensable impurities from illuminating gas—especially naphthalene. For this purpose, instead of arranging the condensers in such a manner that the gas always enters the apparatus by the same inlet and leaves it by the same outlet, the patentee proposes to divide the appliance into a number of units or batteries each having a separate inlet or outlet so arranged that any one of them can be worked first in order, the remainder following in natural sequence. By this means, any unit or battery that has become choked with deposited impurities by reason of its having been maintained at the lowest temperature of the set of which it forms part, can be cleared by placing it in such other position as will permit of hotter gas being admitted to liquefy the partially solidified deposit and allowing the liquefied deposit to flow away through suitable channels. When this process has been completed, the unit or battery can be used in the coolest position of the set.

The patentee shows in diagrammatic forms several arrangements of condensers whereby the improved method may be carried into effect. Fig. 1 (p. 1474) shows in plan and partial elevation a set of six units or batteries arranged concentrically around the inlet-pipe. Fig. 2 gives similar views of another arrangment of four batteries.

In fig. 1 I is the inlet-pipe for the hot gases, and O the outlet for the gas freed from the condensation products. The batteries each consist of pairs of condensers arranged concentrically round the inlet-pipe. Extending outwards radially from the inlet-pipe are a series of three valves, between which two sets of tie-pieces are placed, which serve as inlets or outlets as required. One set of tie-pieces connect to the left with the right-hand condensers of each battery—that is to say, P, R, T, V, X, Z, while the other set of tie-pieces connect to the right with the left-hand condensers of each battery—that is to say, N, Q, S, U, W, Y. The valves of each set are so connected together that when one of them is open the other two of the same set are shut. At the same time that the first valve of the first series is shut, the remaining five sets of valves will be open; and by reason of the connections, the corresponding valves will be open or shut as the case may be. The hot gas will thus pass to X, thence through W to V, thence through U to T, and so on all through the series, until it comes to Y, whence it passes to the outlet-pipe O which surrounds the entire condenser. When it is desirable to change the last battery, the first and last sets of valves are reversed, and the operation will go on as before; W, X becoming the last battery, and so on through the whole series. The tar and other condensation products are drawn off in the usual manner by suitable pipes; and pipes and connections for the water will also be provided.

Fig. 2 shows another arrangement, in which the condensing units, instead of being arranged concentrically round the inlet-pipe I, are arranged in groups or sets of six disposed in parallel lines. In this arrangement, there are four groups of six, numbered 1, 2, 3, 4. Suppose it is required to work these in the order 1, 4, 3, 2, the valves A D will be open, and B and C shut. The gas then passes through unit No. 1; thence through the connecting pipe to unit No. 4, through valves K and H into unit No. 3; thence through the connecting pipe into unit No. 2, and out of the valve F to the main outlet O. For

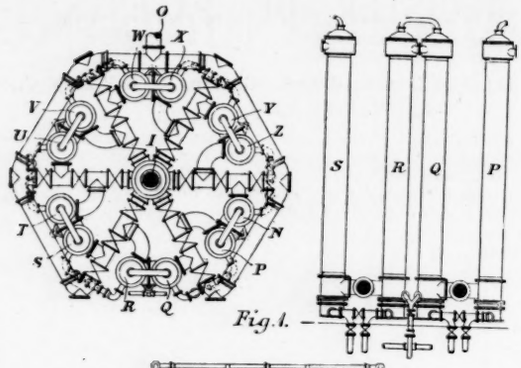


Fig. 1.

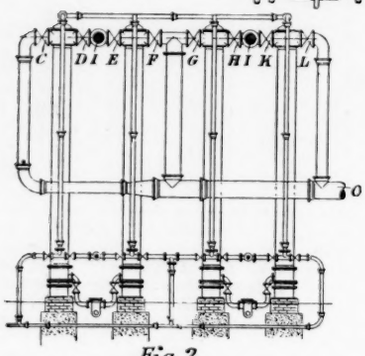
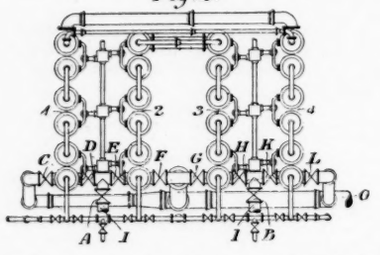


Fig. 2.



working in the order 2, 3, 4, 1, the valves A, E, H, K, C would require to be opened, and the valves D, F, G, B, L closed; the connecting pipes being brought into play in the reverse order. For working 3, 2, 1, 4, the valves B, H, E, D, L will be opened; K, G, F, C, A being closed. For working 4, 1, 2, 3 the valves B, K, D, E, G will be open, and L, H, F, C, A will be closed.

APPLICATIONS FOR LETTERS PATENT.

25,169.—David, E., "Acetylene gas-generator." Nov. 17.
25,181.—Thomson, C. A., "Internal combustion motors." Nov. 17.
25,192.—Langhans, R., "Manufacture of incandescent mantles." Nov. 17.
25,195.—Eckstein, A., and Coates, H. J., "Electrical apparatus suitable for the ignition of gases." Nov. 17.
25,220.—Sieverts, W. H. A., "Incandescent gas-burners." Nov. 17.
25,224.—Winkler, H., "Gas-lamps." Nov. 17.
25,226.—Stubbs, R., "Admitting air for primary combustion, and regulating its supply to furnaces and flues." Nov. 17.
25,253.—Sutton, C. J., and Rudd, J., "Bunsen or incandescent burners." Nov. 18.
25,266.—Stewart, G. M., "Gas-stoves." Nov 18.
25,271.—Crossley, B., "Gas-lighting appliances." Nov. 18.
25,276.—Ewart, G. H., "Water-heating apparatus." Nov. 18.
25,281.—Melles, J., "Gas-engine valve" Nov. 18.
25,319.—Dowson, J. E., "Manufacture of generator gas." Nov. 18.
25,380.—Brown, A. C., "Heat engines." Nov. 19.
25,414.—Burnett, G., "Internal combustion engines." Nov. 19.
25,425.—Grzybowski, J., "Carburetting gas." Nov. 19.
25,445.—Lake, H. H., "Automatic gas-lighters." A communication from C. F. A. Kuhlmann. Nov. 19.
25,475.—Baylis, W. H., "Acetylene gas-generator." Nov. 20.
25,477.—Taylor, W. A., "Carburettors." Nov. 20.
25,479.—Tee, H., "Gas-fires." Nov. 20.
25,489.—Soutter, E., "Galleries for inverted incandescent gas-burners." Nov. 20.
25,514.—Moran, H., and Fraser, R. P. L., "Internal combustion engines." Nov. 20.
25,560.—Robson, J., "Producer gas plant." Nov. 21.
23,575.—Key, J. T., "Manufacture of coke and the recovery of bye-products." Nov. 21.
25,668.—Gillard, T., "Gas-brackets applicable for bakers' ovens." Nov. 21.
25,674.—Mewes, R., and Scharfberg, M., "Production of incandescent gas-light." Nov. 21.
25,713.—Alzugaray, J. B. de, "Generating and manufacturing gases." Nov. 22.
25,747.—Stiles, H., "Inclined gas-retorts." Nov. 22.

CORRESPONDENCE.

[*We are not responsible for opinions expressed by correspondents.*]

Purifier Area.

Sir,—Having been engaged in the Crystal Palace Company's case, I wish to say that Mr. Newbigging's rule was never called into question. It was used as an authority, and I cheerfully accepted it, because the Crystal Palace Company's purifiers are much in excess of Mr. Newbigging's rule, which, as Mr. Shoubridge pointed out to me in discussion, must be taken along with the diagrams in his work, showing his system of four purifiers (of which one is always out of action), connected by a centre-valve. If any use be made of the fourth purifier, Mr. Newbigging would allow that his rule might be enlarged.

In my own treatise on "Purification," read before the Institution of Civil Engineers in 1880, I pointed out that the area was not the only rule, but that depth must be taken into account, as the object was to submit a certain bulk of gas to a corresponding bulk of material, but that with this condition of depth an area of 0·32 foot for the first set and 0 23 foot for the second set—together 0·55 foot—would be necessary.

Subsequent experience has shown me that this may be reduced; but for purifiers on centre-valves, I am all on the side of Mr. Newbigging's rule, having regard to economy, although I know that an enormous amount of purification is done with purifiers with more like half this proportion.

Nov. 26, 1902. Hy. E. Jones.

P.S.—One word as to the correction made in Mr. Stevenson's evidence. I certainly understood him to put it as corrected—viz., that it was the management of the Company in the case that he referred to; not that of the London Companies. It is only just that I should confirm his correction, though I could not agree with his views.

The Naphthalene Trouble.

Sir,—Your correspondent, Mr. Read, apparently has that peace and contentment of mind that are so necessary for the full enjoyment of this life, that one is constrained to ask for fuller particulars as to the condensing system at Redhill. The horizontal system of pipe condensers is so well known and generally adopted that one would expect to hear that naphthalene deposits were a thing of the past. But, in practice, one does not find it is so. Care appears to be needed in the distributing system as well.

The writer has found that, with a certain class of coal, naphthalene deposits are unknown; but with another class of coal, working under the same conditions, deposits occur. Benefit has been found in the latter case by laying service-pipes of ample capacity, so as to reduce friction as far as possible. But if the gas can be so far freed from naphthalene on the works that it can be subjected to friction and reduction of temperature with impunity at Redhill, every gas manager I am sure who is troubled with deposits will be greatly indebted to Mr. Read if he will state the necessary condenser capacity to properly eliminate the naphthalene from gas which may be subjected to a temperature of (say) 45° Fahr. in the distributing system.

Dorking, Nov. 28, 1902. S. Carpenter.

Christmas Hints and Gifts.

Sir,—I see under the heading of "Christmas Hints" in the "Journal" for Tuesday last, that you again refer to the very unpleasant subject of improper dealings between trading firms and some members of the gas industry. It is very much to be regretted that the firms who advise you should have such very grave cause for complaint. It is also to be regretted that the firms have not sufficient courage to deal directly and conclusively with the matter, instead of troubling you to publish to the world that some persons connected with the gas industry have lost their self-respect, and may have been, or are, engaged in communications which could be classed as cunningly framed, and shamelessly deceitful. There are contemptible and unscrupulous persons in all industries. But can the firms who complain conscientiously state that, without intimation to, or consent from, the receiver, they have never given or sent anything of the nature of a present or gratuity to anyone?

Some little time ago, I received a small present with a firm's card enclosed. I did not want it; and should certainly not have bought it. As far as I am aware, that firm does not know that I am not an unscrupulous person, ready—as many are—to take a mean or improper advantage of the firm's action. When I was eighteen years old, the head of a firm called at the works, and, in my father's absence, used every conceivable argument in his endeavour to induce me to open an account by giving him an order, although I explained that I could not do so. He left me, but returned in a few minutes and offered me 5 per cent. for myself (with the promise not to tell my father) if I would give him an order. Nothing could be more unscrupulous and contemptible. I never did, and never shall, open an account with that firm—at any rate, while that man is alive. My opinion of the firm and their customers is a very poor one.

A short time since, I was offered 7s. 6d. commission, with the information that my Company would not have it if I did not. I politely and firmly declined the offer, and was able to use, as the main part of my argument, the fact that my Company pay me very well for my services. There are, however, instances in which a few good cigars, a few pounds of good tea, or a few bottles of good whisky, could be freely and willingly accepted without the slightest suggestion of any improper dealing or influence. During the year, a manager receives letters with the request to attach something to something else; to give particulars when our this or that was forwarded or delivered; will you put on rail the small bag of tools left by our men at your works; will

you unscrew the broken part and attach the new part which we are sending on—in all of which cases the firms would be at considerable expense if the manager was not able and willing to do these little jobs, which do not cost his company as much as twopence. In such instances, I say that it is the duty of firms concerned to make some slight recognition of little services rendered; but many never even say thank you.

Where anyone's self-respect or honesty is in question, it is clearly the duty of one of the parties to assist the other out of the mire. If a firm cannot keep and increase its trade without resort to improper proceedings, it had better shut up shop. "It were better that a mill-stone," &c. There is absolutely no excuse for a firm to spend hundreds of pounds in order to keep their customers or secure new ones. If goods and prices are right, the firm will be successful—at any rate, it is decidedly degrading to stoop so low as some firms seem to have done. Men's self-respect is not given away. Who buys it? If a man buys another's self-respect, then neither can have any respect for the other.

MANAGER.

Nov. 27, 1902.

[It is feared that our correspondent's thoughts have run riot over the paragraph in last week's "JOURNAL" to which he refers; at all events, he has not confined himself to the point with which we were dealing. Censure was principally aimed at the reprehensible parasitic practice, which is constantly spreading among a certain type of Jack's-in-office, of using their positions, whenever opportunity affords, to enrich themselves, by begging, at the expense of those who are engaged in the business of supplying such articles as come within the scope of the particular department in which the "beggars" hold some subordinate position. It is within our knowledge that in not a few cases their operations are not confined to any one firm, but they take several into their range. If our correspondent refers to a previous condemnation of this system, he will find that we blamed the traders themselves for sowing the seeds of the system by having offered presents to customers in the first place. The knowledge of this has with time brought to the doors of trading firms an undesirable army of sycophants and spongers. We differentiate largely between the three aspects of the question—the offering of commissions, the making of a small personal present by traders to actual customers, and the direct or indirect system of begging. It is many years since the word "corruption" was writ large in the "JOURNAL" over the commission system. As to the begging system, to that we have applied many deservedly severe epithets, which we are free to confess have had little impression upon a certain class of people; and, in fact, it appears that nothing short of personal exposure would restrain them. This touches upon the last paragraph of our correspondent's letter; and, with all respect, we may say that there he discloses the narrowness of his experience from the traders' side of the question. What has been written on this subject has not been without a prior "peep behind the scenes." We know of a case where a firm tried the effect of refusing to be bled by departmental subordinates. "Goods and prices" had previously been "right." But suddenly the firm were put to no end of annoyance and trouble in order to maintain business connection at the same level as of old, and to prove that there was no foundation for any allegations that there was a depreciation in the quality of their goods. All men are not so high-minded as our correspondent; and perhaps he will hardly credit it, even if we give him our word that it was so, that in one or two of the cases referred to, meanness descended to the level of underhanded small damage to certain articles in order to prove a depreciation in workmanship. "Men's self respect is not given away!" "Manager" says so; but, with a fair knowledge of the world and its doings, we deny the general application of the statement. And we need go no further than the above instance for an illustration. There is one more point to dispose of in "Manager's" letter. It is found in the last sentence of the first paragraph. Nowhere in our writings on this subject will it be found that we have condemned gratuitous gifts at the Christmas season by trading establishments in cases where they have a real standing business connection, or by way of acknowledgment of service rendered, as instanced in the third paragraph of the letter. But let it be said that, if the extent or value of the gratuitous gift to a person in a fiduciary, managerial, or any subordinate position was measured by the extent or value of the business done, then we should feel that those gifts were passing into the region of bribes. A box of cigars, a case of whiskey or champagne, or a small article of personal use, sent voluntarily by a firm to a man who has a respectable business connection with them is a far different thing in our eyes to a system which (putting things at the extreme for illustration purposes) gives to the man who brings to the firm £20 profit a small box of cigars, and to the man who deals with the firm to the extent of £1000 profit a gorgeous motor car. This in our view would be on a par with the offering of bribes for the retention of business; and, indeed, it could not be done without injury to the recipient's employers, who would without doubt indirectly pay for that car. If "Manager" thinks over what is here written, we venture to say he will find that there is not a great deal of difference between our respective positions.—ED. J.G.L.].

PARLIAMENTARY INTELLIGENCE.

NOTICES GIVEN FOR BILLS (SESSION 1903) RELATING TO GAS AND WATER SUPPLY.

Barnsley Water.—The Barnsley Corporation will apply for an alteration of the provisions of their Order of the present session with respect to the period for the repayment of borrowed moneys, and for the enactment of others dealing with the mode of repayment, the payment of interest, and the discharge of indebtedness.

Bath Water.—The Corporation of Bath intend to apply for authority to construct water-works, comprising a reservoir in the parish of Marshfield, in Gloucestershire, and eight conduits or pipe-lines. Various springs are to be appropriated, and provision will be made for the protection of the sources from contamination. Power will be sought for the purchase of several local private water undertakings. More money will be required.

Belfast Water.—Application will be made by the Belfast City and District Water Commissioners for power to alter a reservoir authorized by the Belfast Water Act, 1893. It is proposed to suspend the sinking fund, extend the period for the redemption of loans, repay out of borrowed money interest paid out of revenue, and pay future interest out of capital. Further borrowing powers will be sought.

Billingshurst and District Gas.—Application will be made for the incorporation of a Company for the supply of gas within the parishes of Billingshurst, Wisborough Green, Kirdford, Pulborough, Stopham, and Fittleworth, in Sussex. Provision will be made for erecting works, laying mains, levying gas and meter rents, and the supply of fittings, &c., and of gas in bulk; also for enabling the Company to produce and supply electricity for lighting and other purposes.

Birmingham Gas.—The Birmingham Corporation have included in the notice they have given for a General Purposes Bill certain provisions affecting their gas undertaking. They wish to be empowered to make, store, and supply gas, and to manufacture and sell residual products, on certain land in the parish of Erdington, in Warwickshire; and also to prescribe the size and material of pipes and fittings on the consumers' premises, make better provision for the lighting of private streets, and lay down pipes in streets not dedicated to the public. It is proposed to ask for the amendment of section 15 of the Gas-Works Clauses Act, 1871, in regard to the connection or disconnection of meters without notice.

Bournemouth Gas and Water.—Application will be made by the Bournemouth Gas and Water Company for power to extend their works at Poole, and to acquire lands and easements by compulsion or agreement. The extensions include an alteration of the quay by making an embankment there, and powers for its construction are to be asked for the Corporation, the Harbour Commissioners, and others. In the Bill, provision will be made to enable the Corporation to construct certain of the works instead of the Company, and to raise and apply moneys for the purpose; and the Company will ask to be allowed to enlarge their capital.

Bradford Corporation.—In a General Powers Bill to be promoted by the Bradford Corporation, provisions will be included for the sale to the Shipley Urban District Council of the portion of the gas undertaking of the Corporation which is situate in that district, and for the sale to the Corporation of the portion of the undertaking of the Council which is within the city. The Corporation will be empowered, in respect of the part of the gas undertaking transferred to them, and the Council in respect of their portion, to exercise the same rights, powers, privileges, and duties as are exercisable by them respectively in relation to their gas undertaking. The Corporation will apply for permission to make regulations with respect to the position, size, and material of pipes and fittings, the position of meters, and the inspection of meters, pipes, and fittings; and they will ask for various other powers in regard to their gas undertaking. Authority will also be sought to construct additional water-works, comprising a reservoir at Hartshead Moor Top, at Clifton, in the West Riding of the county of York, a line of pipes in connection therewith, and four catchwaters. It is proposed to abandon the construction of the reservoir at Hartshead Moor Top authorized in the Act of this session, and certain parts of the pipe-line. Additional borrowing powers will be needed.

Bridgwater Gas.—Application will be made by the Bridgwater Gas Company for the amendment or repeal of their Act of Incorporation, passed in the reign of William the Fourth, and for the continuance of the Company, under their present or some other name, with all their works, rights, powers, and consequential provisions. It is proposed to extend the limits of supply so as to include the borough of Bridgwater, and so much of the parishes of Bridgwater Without, Wembdon, Chilton Trinity, Durleigh, and North Petherton as is situated within a radius of 1½ miles from the Bridgwater Market House. The present capital is to be defined and regulated, and more will be applied for. Provisions of the Bill to be promoted will relate to the acquisition of additional lands, the construction of works, the sale of gas in bulk, the sale or hire of stoves, &c., and other matters. The sliding-scale will be adopted.

British Gaslight Company.—Application will be made by the British Gaslight Company for further powers in regard to the expenditure of capital in respect of new works at their Norwich station, and for the amendment of section 9 of their Act of 1875, so as to increase the amount which the Company may charge as part of the expenses of the management of their undertaking.

Broadstairs Gas.—The Broadstairs Gas Company will apply for power to purchase certain lands described in the notice, and construct and maintain gas-works and store gas, &c., thereon. Authority will be sought to supply gas fittings, meters, engines, dynamos, and other "conveniences" for lighting, heating, motive power, &c.; and the Company will ask that the exemption conferred by section 14 of the Gas Works Clauses Act, 1847, shall apply to the articles so supplied. Additional capital will be required.

Burgess Hill and St. John's Common Gas.—The Burgess Hill and St. John's Common Gas Company, Limited, will apply for authority to change their name, dissolve, and become re-incorporated in a new Company with additional powers and extended limits of supply. They will ask to be enabled to maintain and continue the existing works and construct others in connection therewith, and to make provision for prescribing the sizes of internal fittings, for the supply of such fittings and meters, &c., and for the sale of gas in bulk. Further capital will be applied for.

Bury Water Board.—The Bury and District Joint Water Board intend to apply for authority to carry out certain works, comprising three reservoirs on the Dearden Brook, and three aqueducts or pipe-lines in connection therewith. Streams are to be impounded, and provision will be made for the preservation of the purity of the water, for the protection of the works by which it will be supplied, and for compensation. Additional borrowing powers will be sought.

Chard Gas and Electricity.—The Corporation of Chard will apply for authority to purchase, compulsorily or by agreement, the undertaking of the Chard Gas Company. Provision will be made for the winding up and dissolution of the Company, and the transfer of their existing powers, and others to be conferred, to the Corporation, who will apply for authority to maintain and improve the works, and supply gas and electricity in the borough and parish. The Bill to be promoted will contain the usual provisions in regard to the supply of meters, fittings, and apparatus, the sale of gas in bulk, the testing of gas and fittings, and the levying of rates and charges. The necessary money powers will be applied for.

Commercial Gas.—As notified in our "Parliamentary Intelligence" last week, the Commercial Gas Company will endeavour to have the provisions of their Acts of 1875 and the present session amended in regard to the testing of the illuminating power of their gas and the burner to be used for this purpose.

Crystal Palace District Gas.—The proposals of the Crystal Palace District Gas Company which will be submitted to Parliament next session were noticed in the "JOURNAL" last week.

Derby Gas.—The Derby Gas Company will apply for an extension of their area of supply so as to include the parishes of Chellaston, Elvaston, Aston-on-Trent, Shardlow, and Great Wilne, all in the county of Derby. Provision will be made for the conversion and consolidation of the existing capital, and more will be applied for. The present works are to be maintained, and new ones constructed. The Bill to be promoted will contain provisions for the formation of renewal and other funds, the adoption of the sliding-scale, the regulation of internal fittings, and other matters incidental to the supply of gas. It is proposed to reduce the illuminating power of the gas, and alter the conditions for testing it.

East Ardsley Gas.—The East Ardsley Gaslight Company, Limited, will seek to be dissolved and re-incorporated with additional powers with respect to the maintenance and extension of their works and the supply of gas in East and West Ardsley. Provision will, however, be made for excluding portions of the latter place, under agreement with the Corporation of Morley, from their district; and also in regard to the working of mines and minerals underlying the Company's lands, pipes, or works. More capital is wanted.

East Ham Improvement.—In a General Powers Bill to be promoted by the East Ham Urban District Council, a provision will be inserted to compel a water company to give notice to the Council before cutting off the supply of water from any inhabited dwelling-house in the district, and to impose penalties for non-compliance therewith.

Ebbw Vale Water.—The Ebbw Vale Urban District Council will apply for power to construct water-works in the counties of Monmouth and Brecknock, and to acquire the necessary lands and easements. The new works comprise the enlargement of two reservoirs, and the making of an aqueduct, together with auxiliary works. Provision will be made for preventing discoloration and contamination of the water and preserving its purity, and for its supply in bulk; also for interference with streams, springs, and other property. Additional money powers will be sought.

Faversham Gas.—The Faversham Gas Company will apply for power to convert and consolidate their existing capital and raise more money. It is proposed to purchase by agreement additional lands in the parishes of Faversham and Preston; and powers will be sought for the manufacture and storage of gas and residual products on lands already acquired. Application will be made for authority to reduce the illuminating power of the Company's gas, alter the prescribed burner, and also the sliding-scale and standard rates of dividend. The Company's Act of 1889 is to be amended, particularly the sections thereof bearing upon the last-named matters.

Gaslight and Coke Company.—The principal portions of the notice of this Company's intended application to Parliament next session were given in the "JOURNAL" last week.

Gorleston and Southtown Gas.—The Gorleston and Southtown Gas Company will seek parliamentary authority to hold and use certain land for the construction and maintenance of additional works for the manufacture and storage of gas, and to provide, sell, let on hire, and otherwise deal in meters, stoves, fittings, engines, dynamos, pipes, and other "conveniences" for lighting, heating, and other purposes. Powers now generally included in Gas Bills will be applied for, as well as additional capital.

Hampton Court Gas.—It is the intention of the Hampton Court Gas Company to make application for power to construct, on certain lands acquired by them, works for the manufacture and storage of gas and residual products. The existing capital is to be converted and consolidated, and more will be applied for. It is intended to adopt the sliding-scale, and to make further provisions with regard to the pressure, illuminating power, and purity of the gas, and the mode of testing it. Other matters to be dealt with in the Bill are the supply of stoves, fittings, and other appliances, the sale of gas in bulk, &c. The Company wish to be authorized to lay down tramways, pipes, &c., for the purposes of their business, and to apply to Parliament or to the Board of Trade for power to generate, store, or supply electrical energy.

Harrogate Water.—The Corporation of Harrogate intend to apply for an extension of their area of supply so as to include the urban district of Knaresborough, the parish of Scriven, and so much of the parish of Knaresborough Outer as is not already within the limits. Authority will be sought for the transfer to the Corporation of the water undertaking of the Knaresborough District Council, and also for the construction of works and the laying of mains in that town. Provision will be made for raising more money.

Harrow and Stanmore Gas.—The notice given by the Harrow and Stanmore Gas Company of their intended application to Parliament was referred to in our "Parliamentary Intelligence" last week.

Hexham Gas.—The Hexham Gas Company will apply for authority to acquire by agreement certain lands at Hexham for the manufacture and storage of gas and residual products. The existing capital is to be consolidated and converted, more will be applied for, and the sliding-scale is to be introduced.

Hyde Corporation.—The Hyde Corporation will apply for authority to make further arrangements with regard to their water undertaking; and enforce the provisions of the Rivers Pollution Prevention Act and the Public Health Acts with respect to waters over which they have powers of user, or any watercourses in connection therewith. They will also ask to be enabled to make provision that cisterns used for the domestic supply of water shall, if liable to contamination, be deemed a nuisance within the meaning of the Public Health Act, 1875. Various other powers in connection with water supply will be sought, as well as authority to raise more money.

Ipswich Gas.—Application will be made by the Ipswich Gas Company for power to acquire and hold lands for the general purposes of their undertaking, and to erect gas-works thereon. It is proposed to extend the area of supply so as to include certain parishes in the county of Suffolk, and make provision for levying and recovering rents, rates, and charges therein. The Company desire to have fittings, meters, stoves, and other appliances let on hire, exempted from liability to distress, and to be enabled to make regulations and frame specifications in regard to fittings, and to cut off the supply where these are improper. Additional capital will be required, and provision will be made for the issue of shares or stock to the consumers or to the Company's employees.

Kent Water Board.—Parliamentary sanction will be sought next session for the constitution and incorporation of a Water Board for the urban districts of Beckenham, Bexley, Bromley, Chislehurst, Dartford, Erith, Foots Cray, and Penge, and the rural districts of Bromley, Dartford, and Sevenoaks, in the county of Kent, or some of them, and the transfer thereto of so much of the undertakings of the Kent and Lambeth Water Companies as is situated in that county. Authority will be asked to maintain and improve the existing works, and to enter into agreements with local bodies, commissioners, or other persons, for supplying water in bulk. The Board propose to enter into possession of the undertakings named on an appointed day, before the ascertainment of the amount of the purchase-money. Steps will be taken to have the London Water Bill, now before Parliament, altered so as to allow of the proposed transfer, and for representatives or agents of the Board to take part in any arbitration proceedings affecting any of the Metropolitan Water Companies which may be instituted after the passing of that Bill. The Board will ask for all the necessary powers to levy rates and charges, and to raise money for carrying out their object.

Leigh (Lancs.) Corporation.—The Leigh (Lancs.) Corporation will make an application for the alteration and repeal of the South Lancashire Water-Works Act, 1871, and the Leigh and Hindley Local Boards (Water) Act, 1876, with the view to the dissolution of the Joint Water Committee of the Leigh and Hindley Local Boards constituted by the last-named Act, and the vesting of the reservoirs, water-works, lands, buildings, machinery, and other property of the Committee, in the Corporation and the Urban District Council of Hindley, in the proportions and subject to the conditions set out in an award made by Mr. J. Parry, M.Inst.C.E., of Liverpool, in an arbitration between the Corporation and the Council. Provision will be made for the supply of water in bulk to the Corporation and Council by the Liverpool Corporation. It is proposed to construct a new reservoir in the parish of Westhoughton and two conduits or pipe-lines. The Bill to be promoted will contain a large number of provisions applicable to the government of the district over which the Corporation have jurisdiction, and among them will be one to enable them to supply gas to the owner or occupier of premises abutting upon, or erected in, any private street within the borough. Further money powers will be applied for.

London County Council.—The intended application to Parliament by the London County Council for leave to bring in a Bill next session to alter the existing provisions of the Acts relating to the Gaslight and Coke Company was fully noticed in our "Parliamentary Intelligence" last week. In a General Powers Bill which they intend to promote, a clause will be inserted "to alter the existing method employed by the South Metropolitan Gas Company of testing and recording the illuminating power of gas, and to provide, by repealing section 6 of the South Metropolitan Gas Act, 1900, or by express enactment, or by both of such means, that the method of testing and recording such illuminating power shall be such as may from time to time be prescribed by the Gas Referees appointed by the Board of Trade."

Maidstone Gas.—The Maidstone Gas Company will apply for authority to convert their existing capital into stock, and to raise more money. It is proposed to extend the limits of supply as defined by the Company's Act of 1858, so as to include the borough of Maidstone, the parishes of Boxley, Tovil, Loose, Barming, Leeds, and Hollingbourne, as well as other parishes, portions of parishes, and extra-parochial and other places within a distance of four miles from the Maidstone Town Hall, except such parts of the parishes of East Malling, Ditton, and Teston as are within that distance. Authority will be sought to alter the illuminating power of the gas and the standard price, as defined in the Company's Act of 1880, and to fix a differential standard price or prices to consumers outside the borough, and beyond a radius of 1¼ miles from the Town Hall. Provision will be made for the supply of gas in the ordinary way and in bulk, and the sale and hire of engines, meters, stoves, &c.

Market Drayton Gas.—The Market Drayton Gas Company, Limited, desire to be dissolved and re-incorporated with a change of name. Power will be sought to supply gas in such part of the parish of Market Drayton, otherwise Drayton-in-Hales, as is in the county of Salop, and lies to the west of the Shropshire Union Canal; also to maintain and continue the existing works. The Company wish to be empowered to acquire additional land for the construction of new works for the manufacture of gas and residual products, and to make and supply meters, fittings, &c. Provisions will be included for regulating the supply of gas generally, and its use for engines and other purposes; and also for increasing the capital.

Merthyr Tydfil Water.—The Urban District Council of Merthyr Tydfil wish for authority to construct several aqueducts, reservoirs, and other works in extension of their water undertaking, and to acquire the necessary lands and easements for the purpose. Provision will be made for the prevention of pollution and waste, as well as for altering and increasing the rates and charges. Additional money powers will be sought.

Nantwich Gas.—The Nantwich Gas Company will apply to be dissolved and re-incorporated with additional powers for the supply of gas and residual products in the town and neighbourhood; also to supply fittings, &c. Authority will be sought for the maintenance of the existing, and the construction of additional, works. Further share and loan capital will be needed.

Nantwich Urban District Council.—Application will be made by the Nantwich Urban District Council for power to purchase, by compulsion or agreement, the undertaking of the Nantwich Gas Company, extend the works, and supply gas in Nantwich and adjacent parishes. Provision will be made for the application of the gas revenues and for raising more money.

Nantyglo and Blaina Water.—The Nantyglo and Blaina Urban District Council will apply for power to purchase and hold the existing reservoir at Blaen-y-Cwm Clydach, in the urban district of Ebbw Vale; also to construct a new reservoir and other waterworks, and take, collect, and divert waters, springs, and streams. In the Bill to be promoted, there will be provisions for the protection of the drainage area from pollution, the prevention of waste, and the alteration and increase of the water-rates and charges. More money will be required.

Nelson Corporation.—Application will be made by the Nelson Corporation for an extension of the time specified in the Nelson Local Board Act, 1888, for the completion of the reservoir No. 3, together with a conduit and certain other works in connection therewith. In the Bill to be promoted, provisions will be included for preventing the pollution of water, and generally for improving the supply. Power will be sought to hold and purchase land, and make agreements with owners and occupiers.

Newcastle-upon-Tyne Electric Supply.—Application will be made for the transfer of the electricity undertaking of the Walker and Wallsend Union Gas Company to the Newcastle-upon-Tyne Electric Supply Company, Limited. It is proposed to reduce the capital of the Gas Company, and constitute the transferred undertaking a separate concern in the hands of the Supply Company. Provision will be made for the regulation of capital, revenue, the price of energy, and the dividends.

New Hunstanton Improvement.—The Urban District Council of New Hunstanton will apply for enlarged powers in respect to their water supply, from the area of which it is proposed to exclude the parish of Heacham. Lands and springs are to be acquired, and certain new works, including a pumping-main, carried out. Authority will be sought to sell water by meter. Further powers in regard to the supply of gas will be applied for, particularly with reference to the construction and laying of pipes between mains and meters, and the non-liability of fittings, meters, &c., to distraint for rent; and provision will be made that the Council shall not be deemed to have received payment for gas consumed through a slot meter until the collector has taken the money. The extension of the works is contemplated; and more money will be required.

North Middlesex Gas.—The application of the North Middlesex Gas Company for power to raise additional capital, &c., was noticed in the "JOURNAL" last week.

North-Western Electricity and Power Gas.—Authority will be sought for the incorporation of a Company with power to establish generating stations and supply electricity, and construct works for the manufacture and supply of gas for power, heating, and any other purpose except illumination, in the counties of Chester, Stafford, Derby, Flint, and Denbigh. Authority will be sought for the compulsory purchase of certain lands at Sutton, in the rural district of Runcorn, at Stone, in the county of Stafford, at Bollington, in Cheshire, and at Acrefair, in the rural district of Wrexham. The Company will apply to be enabled to break up streets, lay pipes and wires, &c., levy rates and charges, and make agreements with local authorities, companies, and other bodies.

Oldham Corporation.—Powers will be sought by the Oldham Corporation to enable them to purchase and hold as part of their waterworks the existing Deanhead reservoir, and the works and lands connected therewith; and authority will be asked for the Deanhead Commissioners to sell such reservoir. The Corporation wish to be empowered to carry out certain new works, comprising the enlargement of the above-named reservoir, the construction of another, and a number of aqueducts, conduits, or pipe-lines. Agreements are to be entered into for the better protection of the drainage areas, and bye-laws framed for preventing waste of water and securing its purity. Existing funds are to be applicable for these purposes, and more money will be asked for.

Plymouth and Stonehouse Gas.—The Plymouth and Stonehouse Gas Company will apply for an extension of their limits so as to include the parish of Plymstock, and for authority to exercise their existing powers in the added area, and fix and determine the standard price to be charged therein. The Company will seek to alter the provisions of their Act of 1898 with respect to the standard price in the parishes of Egg Buckland and Tamerton Folliot, and provide for its increase. Additional capital and borrowing powers will be required, and application will be made for a reduction of the illuminating power of the gas.

Rickmansworth Gas.—The Urban District Council of Rickmansworth will apply for power to purchase the undertaking of the Rickmansworth Gas Company, and to supply gas within their limits and the parishes of Rickmansworth Rural and Chorley Wood, also in bulk beyond those limits. The Bill to be promoted will contain provisions authorizing the Council to extend the present works and construct additions, and also to sell parts of the works to other local authorities within the area of supply. The necessary borrowing powers will be sought.

Scarborough Gas.—Application will be made by the Scarborough Gas Company for power to raise additional capital, and alter the time of holding the ordinary meetings. The Bill to be promoted will contain, among other provisions as to the supply of gas, one to exempt from distress stoves, engines, &c., let on hire by the Company, and another to empower them to require users of gas-engines to employ anti-fluctuators to regulate the supply and inspect and test such appliances.

Scunthorpe Water.—The Urban District Council of Scunthorpe will apply for the repeal of section 22 of their Act of 1899, and for authority to construct water-works and other works outside their district, in lieu of those described in the Act. They will ask for power to take the water of springs and streams, and make agreements with landowners and others for its protection from pollution, to employ the funds at present at their command for the purposes of the Act, and to raise more money.

Sheffield Corporation.—In a General Powers Bill for which application will be made by the Sheffield Corporation, provisions will be included for the abandonment of certain works described in the Derwent Valley Water Act, 1899, and the substitution of others; and also for the delivery to the Corporation, by the Derwent Valley Water Board, of water in an unfiltered condition from a portion of the works specified in that Act. The Corporation will ask for authority to enter into agreements with the Board in regard to the construction of the works described in the above-named Act or in the Act of 1901; to raise more money for the completion of the Little Don scheme, and for other purposes; and to apply any surplus revenue arising from the receipts of their water undertaking to certain purposes specified, or to any other object which, in their opinion, will "tend to the improvement of the city and the well-being of the inhabitants."

Sittingbourne Gas.—The Sittingbourne District Gas Company intend to apply for power to extend their works, and for this purpose to acquire a plot of land at Murston. They will ask for further provisions and regulations in regard to the supply and use of gas, gas-fittings, and appliances, as well as for other powers now usually granted to gas companies. Additional capital will be needed by the Company.

Sutton Water.—The Sutton District Water Company will apply for authority to construct additional works, comprising a well and pumping-station at Woodmansterne, and a conduit or pipe-line therefrom to a service reservoir at Banstead. Further capital will be required.

Torquay Water.—The Corporation of Torquay will apply for power to construct a reservoir in the parishes of Christow, Bovey Tracey, and Hennock, in Devonshire, and other works in connection therewith. Provision will be made for protecting the sources of water supply and preventing pollution; and authority will be sought, by an amendment of the Torquay Water-Works Act of 1856, for the Corporation to apply all or any moneys received under it, and arising from their water undertaking, in aid of the district rates of the borough.

Walker and Wallsend Union Gas.—The Walker and Wallsend Union Gas Company will apply for power to extend their works and make a railway into them. The Bill to be promoted will contain most of the usual provisions in regard to the manufacture and supply of gas (including carburetted water gas), &c., and, in addition, a proposal to alter the standard illuminating power and the price. The Company's existing capital is to be converted, and more will be applied for. Authority will be sought for the creation of reserve, insurance, and renewal funds.

Wellington (Salop) Gas.—The Wellington (Salop) Gas Company seek to be dissolved and re-incorporated with additional powers. In the Bill to be promoted, provision will be made for the regulation of the capital; for the supply of "gas of any kind or description, for all or any purpose," residual products, and fittings, &c., in Wellington and the neighbourhood; and for charging for gas on a sliding-scale. The Company will ask for authority to apply for a Licence or Provisional Order under the Electric Lighting Acts, and to use their capital and funds for the purpose.

West Sussex Water.—Authority will be sought for the incorporation of a Company to construct works and supply water in a number of parishes in Sussex. The works will comprise three wells and pumping-stations in the parish of Sutton, two others at Fittleworth, and three service reservoirs in the same parish, as well as a conduit or pipe-line. The capital and borrowing powers are to be defined; and the usual rights and privileges granted to suppliers of water will be applied for.

Winchester Water and Gas.—Application will be made by the Winchester Water and Gas Company for authority to convert their existing capital, raise more, and increase their borrowing powers. It is proposed to provide for the issue of some of the capital to employees and consumers. The limits of supply of both water and gas are to be extended, so as to include the parishes of Headbourne Worthy, King's Worthy, Martyr Worthy, Itchen Abbas, Easton, and Avington, in respect of the former, and, in addition to these places, Morestead, Owslebury, Twyford, Otterbourne, Compton, and the civil parish of Chandler's Ford, in respect of the latter. Power will be sought to acquire lands for gas purposes; and the remaining provisions of the Bill to be promoted will have reference to the manufacture, sale, and hire of fittings, &c., the inspection and testing of meters and fittings, workmen's houses, the regulation of the supply of both gas and water, and other matters.

PROVISIONAL ORDER APPLICATIONS (SESSION 1903).

To the Board of Trade, under the Gas and Water Works Facilities Act, 1870.

Aldershot Gas and Water.—The Aldershot Gas and Water Company require authority to raise more capital and purchase by agreement further lands for the construction and maintenance of additional works.

Amersham, Beaconsfield, and District Water.—Application will be made by the Amersham, Beaconsfield, and District Water Company, Limited, for power to construct additional works, consisting of a service reservoir and two pipe-lines, and extend their limits of supply so as to include parts of the parishes of Chesham Bois and Chepping Wycombe. Further capital will be required.

Bolsover and District Water.—Application will be made by Earl Bathurst and others for authority to supply water in Bolsover, and in portions of the parishes and places of Scarcliffe and Palterton, in Derbyshire. The works comprise a pumping-station in Bolsover, and a line of pipes therefrom to a high-level service tank at Scarcliffe. Power will be sought to manufacture and sell fittings, and frame regulations for the prevention of waste. Provision will be made for the supply of water in bulk, and for the sale or lease of the undertaking. Capital and borrowing powers will be sought.

Brading Harbour Gas.—Application will be made by the Brading Harbour District Gas Company for power to maintain, alter, and extend their existing works, and manufacture, store, supply, and utilize gas, coke, and residual products, within the limits of supply prescribed by their Act of 1878.

Cobham Gas.—The Cobham Gas Company intend to apply for authority to raise additional capital, and make further provision with regard to the supply of gas throughout their district, and particularly to provide that the illuminating power shall not be less than 14 candles. A clause in the Order will make it clear that the Company are not to be deemed to have received payment for gas consumed through a slot meter until the amount has been taken from the meter by the Company's collector.

Conisbrough Gas—The Conisbro' Gas Company, Limited, will apply to be reconstituted under the name of "The Conisbrough Gas Company, Limited," and for authority to maintain and construct gas-works, and manufacture and supply gas and residual products within part of the township and parish of Conisbrough, in the West Riding of the county of York. The capital of the Company is to be regulated and defined, and provision will be made for increasing it, as well as for enlarging their borrowing powers.

Crossgates Gas.—The Crossgates, Halton, and Seacroft Gas Company, Limited, will seek authority to purchase, by agreement, additional lands at Barwick-in-Elmet, in the West Riding of the county of York, and construct thereon works for the manufacture of gas and residual products. The Company's capital is to be converted and increased, and their Order of 1898 amended with respect to the price to be charged for gas. A standard price with sliding-scale of dividend is to be introduced.

Goring and Streatley Water.—Application will be made by the Goring and Streatley District Gas and Water Company, Limited, for an extension of their limits of supply so as to include certain adjacent parishes, and for authority to construct new works, comprising a filtering-tank at their existing pumping-station, a reservoir and pumping-station at Goring, another reservoir at Greenmoor Hill, and various conduits or pipe-lines. It is proposed to increase the capital of the Company, and to change the name to "The Thames Valley and Goring Water and Gas Company, Limited."

Hailsham Gas.—The Hailsham Gas Company will apply for power to continue their existing works, construct and maintain others on a new site, and supply gas within the town and parish of Hailsham and parts of the parishes of Arlington and Hellingly, in Sussex. The existing capital is to be defined, and more will be applied for. The Order will contain the usual provisions as to the supply of meters, fittings, &c.

Herne Bay Gas.—Application will be made by the Herne Bay Gas and Coke Company, Limited, for authority to extend their limits of supply so as to include the parish of Reculver, and exercise therein all the powers granted by their Order of 1899. An increase of capital will be asked for.

Leatherhead and District Water.—The Leatherhead and District Water Company will apply for power to raise additional capital, by any of the usual methods, for the general purposes of their undertaking.

Ludgershall Water.—Application will be made for authority to construct and maintain water-works and supply water at Ludgershall, in Wiltshire, and at Kimpton, in Southampton. The Order will include special provisions for the protection of the works, &c., as also one for the sale or lease of the undertaking.

Mid-Kent Water.—Application will be made by the Mid-Kent Water Company for authority to extend their limits of supply so as to include a number of parishes and places in Kent, or some parts of them, and generally exercise their powers therein.

Pembroke Docks and Town Gas.—Application will be made by the Pembroke Docks and Town Gas Company, Limited, for power to construct and maintain additional works, and to acquire and hold further lands for the purposes of their undertaking. Provisions will be included in regard to the supply of gas engines, stoves, pipes, fittings, &c.; the pressure, quality, and testing of gas; the purchase or erection of workmen's houses; and the sale of gas in bulk. More capital will be applied for.

Riddings District Gas.—The Riddings District Gas Company will apply for power to extend their limits so as to include certain portions of the parishes of Codnor Park, Alfreton, Heanor, and Ripley, in Derbyshire, and Selston, in Nottinghamshire, raise additional capital, and erect houses for their servants. They will seek exemption from penalty in certain cases, and ask that their fittings, &c., may not be liable to distress.

Rodbourne Cheney Water.—Authority will be sought by the North Swindon Estate Company, Limited, to maintain and continue the existing water-works at Rodbourne Cheney, in Wiltshire, and supply water in that parish, and also in bulk to local and sanitary authorities and others both within and beyond it. The capital is to be fixed and defined, and provision will be made for its increase.

Sheepshed Gas.—The Sheepshed Gas and Coke Company, Limited, will seek authority to maintain and continue their existing works, and supply gas in the parishes of Sheepshed and Garendon. The Order will contain the usual provisions, as well as additional money powers.

South Holderness Gas and Water.—Application will be made by a private gentleman for power to construct gas-works and manufacture and sell gas and supply water within the parishes of Preston and Paull and the borough and parish of Hedon, in the East Riding of the county of York, and to levy rates and charges.

St. David's Water and Gas.—The St. David's Water and Gas Company intend to apply for authority to raise additional capital, and they will ask for further powers in respect of their gas and water undertakings. As to the former, these will relate to the supply of engines, metors, stoves, and fittings; in the case of the latter, to the protection of the water from contamination. The Company will also seek relief from the compulsion to supply baths and closets, and will apply to be allowed to sell water by meter in certain cases.

St. Ives (Hunts.) Gas.—The St. Ives (Hunts.) Gas Company, Limited, will apply for power to raise additional capital by the creation and issue of new shares or stock and by borrowing on mortgage, or in such other way as may be defined in the Order.

St. Neots Water.—Application will be made by the St. Neots Water Company for power to raise additional capital by any of the usual methods.

Strabane Gas.—Application will be made by the Strabane Urban District Council for power to construct works on lands specified, and supply gas in their area.

Tipperary Gas.—The Tipperary Gas Company, Limited, will apply for authority to maintain and continue their existing works, and from time to time to enlarge them, and manufacture and supply gas, &c. The existing capital is to be regulated, defined, and converted; and power will be sought to increase it.

Wexford Gas.—The Wexford Gas Consumers' Company, Limited, intend to apply for power to maintain and continue their existing works, convert residual products and manufacture and sell gas, and also supply fittings and apparatus, within the borough of Wexford. They wish for authority to buy ships, and use them for carrying coal and other freight. The existing capital is to be defined, and more will be asked for

Woking District Gas.—The Woking District Gas Company, Limited, will apply for an amendment of their Order of last year so far as respects section 12, which it is proposed to strike out, to allow of the substitution of another setting forth that if in any year the net revenues of the Company applicable to dividend are insufficient to pay the full rate on each class of ordinary stock or shares, they are to be applied in the payment of dividends *pari passu* up to 7 per cent. per annum, and the balance (if any) used in further payment of the maximum dividend of 10 per cent. on the ordinary stock or shares.

To the Local Government Board, under the Public Health Act, 1875, and the Gas and Water Works Facilities Act, 1870.

Cudworth Gas.—The Cudworth Urban District Council will apply for authority to erect works and supply gas, meters, fittings, and apparatus in their district, under the powers usually granted to gas companies, and to do plumbers' work and repairs in connection therewith. They will also seek permission to purchase gas in bulk from the Barnsley Gas Company, or any other company, authority, or person having the right to supply it. The necessary borrowing powers will be sought.

Hucknall-under-Huthwaite Gas.—The Urban District Council of Hucknall-under-Huthwaite will apply for power to construct works and supply gas, stoves, meters, &c., within their district. Authority will be sought for the purchase of a portion of the undertaking of the South Normanton, Blackwell, and Hucknall-under-Huthwaite Gas Company, Limited, and the confirmation of any agreement or agreements relating thereto. More money will be required.

Meltham Gas.—Application will be made by the Meltham Urban District Council for power to purchase and hold additional lands for the purposes of their gas undertaking, and to erect thereon works for the manufacture and storage of gas and residual products. Borrowing and other money powers will be applied for. If the Local Government Board think fit, the Council will seek to accomplish the objects they have in view by an amendment of their Order of 1887.

Spalding Gas.—The Spalding Urban District Council will apply for power to manufacture gas and residuals, purchase lands, supply gas and fittings, and levy rates and charges. More money will be required.

To the Secretary for Scotland, under the Private Legislation Procedure (Scotland) Act, 1899.

Aberdeen Gas.—In a Tramways Order to be applied for by the Aberdeen Corporation, power will be sought to borrow more money for the purposes of their gas undertaking.

Glasgow Corporation.—In an Order embracing various objects, the Corporation of Glasgow will seek authority to use gas, electricity, or other illuminant, for the purpose of lighting public and private streets, courts, and common stairs, and to levy an assessment therefor, of which one-half is to be borne by the proprietors and the other by the tenants or occupiers; or provision may be made that the cost, or some portion of it, may be defrayed out of the assessment for police purposes under the Police Act of 1866.

Grangemouth Water.—Authority will be sought by the Town Council of Grangemouth to construct additional works, comprising a reservoir, an embankment, two conduits, &c. The existing debt for the

water-works is to be consolidated and the sinking fund postponed. Further borrowing powers are required.

Irvine and District Water Board.—Authority will be sought for the constitution of a Water Board, and the transfer thereto of the water undertaking of the Corporation of Irvine, with power to carry it on. The limits of compulsory supply are to be extended. The Board will seek to be authorized to borrow money for the undertaking.

LEGAL INTELLIGENCE.

HIGH COURT OF JUSTICE—CHANCERY DIVISION.

Friday, Nov. 28.

(*Before Mr. Justice* BYRNE.)

Beven and Alexander v. Welsbach Incandescent Gaslight Company.

This was a motion for the sequestration of the property of the defendants, and for the committal of the Directors, for their alleged contempt in disobeying a consent order made by Mr. Justice Buckley on the 20th of June last.

Mr. ROWDEN, K.C., appeared for the plaintiffs; Mr. LEVETT, K.C., and Mr. WALTER for defendant Company; and Mr. MULLIGAN, K.C., for the Directors.

Mr. ROWDEN said the plaintiffs were the makers of an incandescent mantle, called the "Vivid," which was the subject of two patents, of 1896 and 1899 respectively. In 1901, before beginning to sell the mantle, they communicated with the Welsbach Company, submitted samples, and invited them, if they thought fit, to take proceedings. But nothing of the sort was attempted; and the plaintiffs therefore commenced selling the mantles. In April, 1902, however, the defendants threatened two customers of the plaintiffs—viz., Messrs. Faudell, Phillips, and Co., and a Mr. Pullen—and on the 16th of May the plaintiffs commenced what was known as a "threats" action. In this a motion was made, which stood over at the defendants' request, that they might file evidence. But they filed none; and on the 20th of June the order was made by consent, of the breach of which he now complained. The defendants then undertook not to threaten any person with legal proceedings or liability in respect of the manufacture, sale, use, or purchase of incandescent mantles made or sold by the plaintiffs, and known as "Vivid Patent Incandescent Mantles," and not to allege that such manufacture, use, sale, or purchase, was an infringement of the letters patent belonging to the defendants; and on these undertakings an order was made to tax the costs and stay all further proceedings, except such as might be necessary to enforce the order. There were, as he understood it, two distinct undertakings given—one not to threaten anybody, and the other not to allege that the "Vivid" mantle was an infringement of the Welsbach patents. He should show that there had been a breach of both undertakings by threatening two, if not three, of plaintiffs' customers, and by actually bringing an action for infringement against plaintiffs themselves.

Mr. LEVETT said there was no understanding not to issue a writ.

Mr. ROWDEN said there could not be a plainer allegation of infringement than the issue of a writ. He proceeded to read the affidavits; and,

On the rising of the Court, the motion was adjourned.

TAUNTON BOROUGH BENCH.—Monday, Nov. 24.

(*Before Mr.* T. PENNY *and a Bench of Magistrates.*)

Electric Light Charges at Taunton—Alleged Tampering with Meters.

For some time past, the charges made for electric light in the borough of Taunton have occupied a good deal of public attention. The matter came before the Town Council at their October meeting, and was dealt with at considerable length, as notified in the "JOURNAL" at the time (*ante*, p. 1097). It resulted in a series of charges of tampering with the consumers' meters being brought against the Borough Electrician (Mr. E. B. Thornhill); and these formed the subject of magisterial investigation on the above-named day. The hearing, which took place in the Municipal Hall, was followed attentively by the Mayor (Mr. Standfast) and nearly all the members of the Council, as well as by a large number of the leading residents in the town. There were in all seven charges, which may be concisely stated as follows: (1) That the accused, in the month of April last, when acting as an officer and servant of the Electrical Committee of the Town Council, did unlawfully and wilfully, and with intent to defraud, concur in making certain false entries in an account delivered to the Public Benefit Boot Company (Leonards, Limited), Taunton, for electric light alleged to have been supplied to them for three months prior to March 31, 1902, contrary to the form of the statute. (2) That on May 8, 1902, he unlawfully and knowingly caused a banker's cheque and order for payment of £9 2s. to be delivered by that Company to Edwin Jarvis for the use and benefit of the Electricity Department of the Council, with intent to defraud. (3) That in the month of January, 1902, he did unlawfully alter the index of an electric light meter then in the possession of the Company. (4) That in the same month he unlawfully altered the index of an electric light meter then in the possession of Mr. Saunders. (5) That in the month of April, 1902, he altered the index of an electric light meter then in the possession of Robert Griffiths Williams. (6) That he did aid, abet, counsel, and procure the commission of the misdemeanours set out in the third, fourth, and fifth charges, by one Alfred Ernest Perry Witham, by causing him to unlawfully alter the index of each of the electric light meters named, with intent to defraud. (7) That he did unlawfully solicit and incite Witham to alter the indices of the respective meters, and, further, in January, 1902, solicit and incite him to alter the index of a meter then in the possession of Mr. Cross, and in February to alter that of the meter in the possession of Mr. Goodland, with intent to defraud.

Mr. WANSBROUGH conducted the prosecution; Mr. H. GREGORY appeared for Mr. Thornhill.

Mr. WANSBROUGH, in stating the case, said the defendant was the Electrical Engineer of Taunton, and had occupied the position for some four or five years. His business was to superintend the working of the electric lighting system, and see that the proper duties were performed by those under him. The allegations made against him were that he had done that which was dishonest and a misdemeanour at common law, because it was alleged that he had, either by himself or by somebody acting on his instructions, altered the electric light meters in order to show a presumed consumption over the amount which was actually consumed, and had sent in, or caused to be sent in, bills to the consumers alleging that there was a larger consumption of electric light than in fact there was. If he (Mr. Wansbrough) substantiated this statement, their Worships could not doubt that it was not only a grave charge, but an extremely impudent case of fraud. If his instructions were correct, there was an utter absence of the nature of honesty in the working of the electric light in Taunton. A young man of the name of Witham, who had received the highest credentials from the defendant and from those members of the Corporation who formed the Electrical Committee, and was thoroughly competent, had been in the service of the Corporation, in the Electricity Department, ever since they undertook the supply, and for the last 3½ years he had been chief assistant to the defendant. His wages were 45s. a week up to February last, when he was requested by Mr. Thornhill to accept the reduced salary of 35s., because he was told the Electric Light Committee could not afford to pay more than this. If it was a matter of moment to them to make this reduction, it was also a matter of moment to increase the amount received from consumers. Witham remained on at the reduced salary until the middle of July, when he was given notice to go, and he left. During the course of his business, he had various written instructions from the defendant; and these, having been acted upon, were consigned to the waste-paper basket. But his father discovered some of the documents there, and it was in consequence of inquiries made by him that the orders had been found. It was these orders which would show the alleged fraud. For the whole time that Witham had been in the position of chief assistant to the Electrical Engineer, he had received instructions from him as to what he should do. His duties were to go round and examine and test the meters, and put them right; and he was given instructions that whenever a meter showed the same consumption in one month or one quarter as it had shown in the previous year, he should put it on. Instructions were also given by Mr. Thornhill as to how much it should be put on. He (Mr. Wansbrough) would show from documents that Witham received instructions that whether the meters were slow or fast they should be put on 50 or 100 units. In the particular case which formed the subject of the first charge, the facts were these: On the 21st of January last a slip written by the defendant was given to Witham. Upon it was written: "Public Benefit Company. If meter slow and dirty, put it on about 300." Witham went to the shop of the Company, and found that the meter was all right. He therefore went back and told Thornhill so. Thornhill said: "Have you put it on 300 as I told you?" Witham replied: "No; because I have told you the meter is all right." Thornhill then said, "Go back and put it on." Witham thereupon returned and put it on 100, being afraid to put it on 300. It had been explained to him, and he had told Thornhill, that the reason for the consumption being less than hitherto was that the Manager had been using a smaller number of lamps. Yet Thornhill told Witham to put the meter on 300, and sent him back. Thornhill said: "Is that all you have put it on?" and Witham's reply was "Yes; they have been cutting down the light." If that were true, what could be a grosser fraud? Another slip stated: "M'Aulay, Nag's Head: If slow, put on 60." Witham found the meter was going very slightly slow, and he put it on 60, because his instructions were that if it were slow—it did not matter how slow—he was to put it on 60. On many occasions Thornhill had told Witham not to put on the meters if the consumers read them themselves; and in some cases he said, "You can put it on 10, because we can easily say that it made a mistake of 10. If people do read their meters themselves, and you get a chance of putting them on 10 do so." On the 20th of January, Witham went to Messrs. Gregory and Wrenn's establishment. His instructions there were: "Gregory and Wrenn. If meter slow, put on 30 to 50." He went there, found the meter slightly slow, and put it on 40. There was no calculation in any of these cases as to the percentage of slowness. Witham was told that he was not to inform the consumer that he had in any way altered the meter. On the 14th of April, Witham called on Mr. Medway, a butcher, and, according to instructions, put on 40 or 50 units. On the 22nd of January, he called at the London Hotel, where the meter was a little dirty; but it practically registered all right, and he put it on 40, in accordance with instructions. With regard to Mr. Griffiths Williams, on the 5th of April Witham received instructions as follows: "Griffiths Williams, Fore Street. If slow, put on 100." Witham went there, and saw that the meter was very slighly inaccurate. Nevertheless, in accordance with instructions, he put on 100 units, which represented £2 10s. Meters were put on without the consumers being consulted or asked for any explanation as to how the deficiency could be accounted for. Mr. Wansbrough said he could produce 28 sheets on which were orders to put on the meters of no less than 89 consumers. The number of units ordered to be put on was 3052, which, at 6d. per unit, would be £76 6s. These orders ran over only two months; and if they took the 28 sheets as representing an increase in the income of the Committee amounting to £76 6s., then if 45 other sheets which were missing were anything like them, it would amount to about £120. This, added to the £76, made up the astonishing figure of £200, which had been extorted from confiding consumers through this fraudulent way of tampering with their meters; and this was in one half year. It might be asked: What benefit would the defendant reap from this? That, however, did not matter, as the

Act of Parliament under which he was charged provided that if any person obtained anything by false pretences—not for his own benefit, but for the benefit of anybody else—he should be considered as guilty as if he had done it for himself. In June last, Witham seemed to have doubted whether he was doing what was right, because he went to Thornhill and said: "Do you think it is right to put on the meters in the way you have ordered me to do?" Thornhill said: "Yes; why?" Witham replied: "I have spoken to a friend about it, and he advises me that not only it cannot be done, but it is a fraud, and we should be liable to penal servitude." Thornhill asked: "Who told you?" Witham answered, "A solicitor." Thornhill inquired who it was; and Witham replied that it was a solicitor not living in Taunton. Thornhill said: "It's all rot." This showed that Witham was acting innocently in the matter up to that time; but it did not matter, because they had the written instructions of the defendant to do what was done. Mr. Wansbrough gave a number of other instances of meters being put on, one being at the office of the "Somerset County Gazette." On the 20th of January, there was an instruction to this effect: "'Gazette' office. If slow, put on about 200." On the 14th of April, there was again: "'Gazette' office. If slow, put on 370." So that between the 20th of January and the 14th of April the office was put on 570 units.

Mr. GREGORY: For which restitution has been made.

Mr. WANSBROUGH said the 570 units meant a matter of nearly £16; and the amount was put on without mentioning one word at the office, or consulting with them, or doing anything to ascertain whether this were just or not. If there were any defect, he would soon put the meter right; and how came it, therefore, that in April 370 more units were to be put on to these unfortunate people? Mr. Wansbrough went on to cite cases in support of the charges, and concluded his address by pointing out that, under their Electric Lighting Order, as well as under the Act of Parliament, if any difficulty arose between the Corporation and the consumer it should be referred to the inspector of meters. Here the unvarnished facts were that, without consulting the consumer, or attempting to ascertain whether his meter had or had not registered correctly, there was an absolutely arbitrary figure fixed by the Engineer in his private office, and instructions given to his subordinate to go out and tamper with the meter, and thus bring about what was an actual and undoubted fraud. He submitted that he had clearly made out a case for investigation by a Superior Court; and he would ask their Worships to commit the defendant for trial.

Mr. *A. E. P. Witham* was then called, and, in answer to Mr. WANSBROUGH, said he commenced testing meters about 3½ years ago, and at the very outset received instructions from the defendant that if a meter showed the same consumption as in the corresponding period of the previous year, he was to "put it on" if he could. In November, 1901, Mr. Thornhill started a "meter order book," and the 28 sheets produced were taken therefrom.

Mr. GREGORY (to Mr. Wansbrough): We are here to ascertain whether the charges made are *bonâ fide*. Unless you deal with the particular charges, I shall object to the orders being put in.

Mr. WANSBROUGH: I submit that I am entitled to put in any to show the course of conduct of the defendant. I maintain that I must mention the other cases which do not appear in the charge.

Their Worships conferred on the matter, and decided to adhere to the five cases mentioned in the charges.

Witness was then further examined, and bore out the statements made by Mr. Wansbrough.

At this stage, the proceedings were adjourned for a short time. On the resumption of the inquiry,

Mr. W. H. FOWLER, one of the Magistrates, who was the Chairman of the old Electric Light Company, pointed out that he had been a member of the Town Council, and also of the Electric Light Committee; and he suggested that perhaps Mr. Wansbrough would wish him to retire from the Bench.

Mr. WANSBROUGH said, under the circumstances, he quite understood Mr. Fowler might like to retire. He (Mr. Wansbrough) had no doubt Mr. Fowler had a perfectly open mind on the matter under investigation; but since it had been put to him, if placed in similar circumstances, he thought he would retire.

Mr. FOWLER said he had been asked to come; but he would retire, especially as they would have a strong Bench even without him.

Witness was then cross-examined by Mr. GREGORY. He said he was discharged from the service of the Corporation in July last, but he did not resent this treatment. He executed his orders, generally speaking, within a day of their receipt, and when they were done with he threw them away. He accounted for those produced by the fact that they had been in his father's waste-paper basket for six months; and he first knew of their existence some time in August. His father had a conversation with Mr. Thornhill about him (witness) being taken back, and a letter was written upon the matter. He never saw the letter. He was called in on the occasion of a meeting of certain ratepayers; but it was in October that he made statements similar to those he had made in evidence.

Mr. GREGORY: Do I understand, as the result of your evidence, that you always obeyed the written instructions that were given to you, and that if you were told to mark up a certain number of units you always did it?

Witness: If I possibly could.

Do you mean if nobody else was looking?—Yes; or if the people did not read the meter.

If your order was "Put on 30," would you put on the 30, whether the meter registered correctly or not?—Yes; if I possibly could.

When you were sent round to test meters, were you not told, when you found one running short, to find how much it was short and put it on accordingly?—No; never.

When you put on the meters in 1900, how did you arrive at the amount which was to be put on?—It was always given to me.

Were not the figures of the corresponding period of the previous year given you to show how slow the meter was running?—They were given me to show how to put it on.

Cross-examination continued: He never did anything with the meters on his own responsibility. He only put on less than the figures given to him when two figures were mentioned. In the case of the Boot Company, he found the meter all right, and he put on 100 when sent back to put on 300 units. Mr. Griffiths Williams's meter was slow, and he put it on 100. In the case of a visit to a certain private house, the lady and the servant were watching him, so he marked his order: "Could not put on." In the case of the "Somerset County Gazette" office, the meter did not register at all at first, and he took the magnet out to make it go right. He did not know that this would make it worse.

Mr. *E. F. Green*, Manager of the Taunton Branch of the Public Benefit Boot Company (Leonards, Limited), said that in April or May last, he received a bill from the Corporation for the supply of electricity; the amount being £9 2s. He produced the cheque sent from head-quarters in payment of the amount, and the receipt given in return. He had now the same number of lights on; but he had reduced the use. The four 16-candle lights which were at one time employed every night were now only used once a week.

Cross-examined by Mr. GREGORY: He heard about the matter from head-quarters in the first place. Then Mr. Witham, the father of the first witness, called on him. He was not in a position to say whether the meter was correct or not.

Mr. *R. Griffiths Williams*, draper, of Fore Street, Taunton, produced his account for electric light up to March 31 last, and the receipt for the amount—£8 9s. For the corresponding quarter of the previous year, it was £8 3s. 9d. In the latter quarter he used less light, by reducing the candle power of the lamps, and had not burnt the lights so long.

Cross-examined: He had been subpœnaed by the prosecutors.

Mr. GREGORY: Who are they?

Mr. WANSBROUGH: Messrs. Leonard, Limited. We are not ashamed of it.

Mr. *E. Jarvis*, the rate collector to the Corporation, identified several accounts sent out for electric light from their offices. He said these accounts were made up from the meter-books [produced], which were under the control of the defendant.

Mr. WANSBROUGH put in a book, which, he said, in the case of the Boot Company, showed that the number of units consumed had been altered from 323 to 423. The bill having been sent out with that alteration constituted the false entry. Several other items were read from one book, and the alterations in the meter-book were pointed out. Witham's figures were entered in his book, and were then placed in the meter-book, where the alterations were to be sent; and these tallied with the instructions given to Witham.

Mr. GREGORY said there was no proof that Thornhill had made the entries or the alterations.

The MAGISTRATES' CLERK: We must have proof that he made the alterations. There might be others implicated.

Mr. WANSBROUGH: There are a good many, if they had the honesty to come forward.

Mr. *A. W. Norris*, Borough Accountant, said the meter-books came into his custody once a month, and he made out the accounts from them with the aid of his clerk. The alterations were made, it seemed, by his clerk, and they were sent up from the works. The alteration in regard to the Boot Company from 323 to 423 units was in his writing, and also the total—£7 15s. 3d. to £9 0s. 3d. He only took instructions from or through Mr. Thornhill, who during the greater part of the year would have the custody of the books.

By Mr. GREGORY: If he found discrepancies in the figures, he communicated with Mr. Thornhill. He did not know how the number of units was arrived at.

Mr. WANSBROUGH: Are all the alterations made in your office?

Witness: Some are made in my office; but most at the works.

Mr. WANSBROUGH: Now we have it. They are done at the works.

This closed the case for the prosecution.

Mr. GREGORY said he would like to know what charges his friend, Mr. Wansbrough, asked the Bench to commit the defendant upon, and on what grounds. He could understand the first charge; but he did not know that there was anything, either in common or statute law, dealing with electric light meters.

Mr. WANSBROUGH: For making false entries in the meter-books. These books have not been seen before, and the alterations have been proved to be made; and I ask your Worships to commit the defendant for trial. With regard to the other charges, I do not see the learned Counsel's contention. He has asked under what statute the charges are preferred. They are preferred under the common law; and I do not quite understand what he means when he says it cannot be under common law because electric meters were not known years ago. If a person does that which is an offence against honesty or morality, he commits an offence against the common law, for which he can be committed for trial.

Mr. GREGORY said it was to be regretted that, in the circumstances of the case, criminal proceedings should have been brought, because he submitted that this was not a case in which they should have been instituted. There could have been a civil inquiry into the question, and the whole of the facts could have been brought out. His friend had to prove two things before the defendant could be committed—guilty intent, and that he had done these things with the intention of defrauding. He submitted that his friend had not proved this. He quoted the Public Authorities Protection Act in support of his argument.

The CHAIRMAN said the Magistrates thought it would be better for them to consider the matter at this point, rather than allow Counsel to address them at once; and, if necessary, he would have an opportunity of doing so afterwards.

The Magistrates then retired. After a short absence,

The CHAIRMAN said the Bench were not satisfied that a sufficient case had been made out upon which to commit the defendant for trial, and they therefore dismissed all the charges.

The decision was received with loud applause.

Mr. WANSBROUGH said he would take his clients' instructions; but, in all probability, he would ask their Worships to bind them over to prosecute at the session.

The hearing of the case occupied nearly six hours.

WILLSON CALCIUM CARBIDE PATENT APPEAL CASE.

Last Wednesday, judgment was given by the Court of Appeal, composed of Lords Justices Vaughan Williams, Stirling, and Cozens-Hardy, in an appeal from the decision of Mr. Justice Buckley in an action brought by the Acetylene Illuminating Company, Limited, against the United Alkali Company, Limited, to restrain the defendants from an alleged infringement of a patent granted in 1894 to Mr. T. L. Willson, of New York, for "improved metallic carbides, applicable for use in the production of acetylene, and means for producing the same." Prior patents of 1890, 1891, and one (No. 16,342) of 1894, previously relied upon, were abandoned at the trial. The defendants alleged that the invention in question was not new, and that consequently the patent granted in respect of it was invalid; and they denied that they had infringed the patent. His Lordship decided both points in their favour, and dismissed the action with costs. (See "JOURNAL," Vol. LXXIX., pp. 284, 354.) The plaintiffs appealed, and their views were laid before the Court at considerable length by Mr. Fletcher Moulton, K.C., M.P., and Mr. Colefax; the contentions of the defendants being submitted by Mr. Cripps, K.C., Lord Robert Cecil, K.C., Mr. A. J. Walter, and Mr. Bucknill. The arguments, which occupied several days, were concluded on Tuesday, and their Lordships delivered judgment next morning. Dealing with the question of anticipation, Lord Justice Vaughan Williams said the two anticipations which had been relied upon were the paper read by M. Moissan before the French Academy of Sciences and the patent of Mr. Willson. With regard to the former, he was disposed to believe that, when M. Moissan communicated the paper, he was thinking only of the operation performed in the furnace, which had previously been referred to in prior papers published by him. He thought M. Moissan had been engaged in investigations to ascertain what was the effect of the thermal or electrolytic operation of an electric furnace, and did not, in his last paper, mean to do anything more than carry them one step further. But the result of his investigations was to show that the intense heat, described as of 3500° C., which would be produced in an electric furnace, was sufficient to enable the production of (*inter alia*) these calcium carbides; and their Lordships would take this as part of the knowledge of the world interested in the production of these carbides. With regard to the patent of 1892, it was, in his Lordship's opinion, perfectly plain that at the time of its publication the state of knowledge was such that it was known that the necessary heat for the operation of reduction had been attained by the use of the electric furnace, by which the current was not only brought near the ore so as to heat by radiation, but was also passed through the material. For this reason, he thought the anticipation relied upon by the defendants had been established. He entirely agreed with what the learned Judge in the Court below had said in the course of his judgment—that the matter in question here was not good subject-matter of a patent. To have it, there must be some invention—a new result, or a new process; and if one of these elements was not included, the patent could not be supported. In his opinion, the decision of the learned Judge was right, and the appeal must be dismissed with costs. The other Lords Justices concurred.

Gas Stoker Sent to Prison for Neglecting Work.

On Saturday, the 22nd ult., the Chichester City Magistrates were asked to inflict an exemplary sentence upon William Bailey, jun., for committing a breach of contract as a servant of the Chichester Gas Company. Mr. J. A. Morris Bew appeared in support of the summons. The defendant was until lately a labourer and stoker employed at the gas-works; and on Tuesday, the 4th ult., he was told to go home at midday and prepare to come on at a quarter to six in the evening to take his turn for the night shift with three other stokers. He left the works for the purpose, but did not return according to instructions; and a son of Mr. Church, the Company's Engineer, eventually found him drinking in a public-house. He declined to come to work, and did not put in an appearance until the following Friday. In consequence of this conduct, loss and inconvenience were caused; and as it was impossible to get a stoker at a moment's notice, another workman had to be put on to give what time he could spare to fill the defendant's place. Next morning there was a shortage to the extent of 14,000 cubic feet in the gas which ought to have been manufactured; and it was pointed out that this would have a considerable effect on the pressure for the public supply. After hearing the evidence of Mr. Church and his son (Mr. Gerald Church), the Magistrates sentenced the defendant, who did not appear, to one month's imprisonment, with hard labour.

Opening of Streets by a Gas Company without Permission.

At the Barnard Castle Police Court last Wednesday, the Barnard Castle Urban District Council summoned the local Gas Company under the Public Health Act for breaking up the streets without permission. Mr. J. I. Dawson, the Clerk to the Council, in opening the case, said he regretted the matter should have been brought before the Justices in this manner, because he thought, with a little more courtesy on the part of the Company, it might have been avoided. The proceedings were brought under section 149 of the Public Health Act of 1875, which in the first instance vested the streets in the Urban District Council. Mr. J. W. Heslop, who appeared for the Company, admitted the streets were so vested. Mr. Dawson said it was the duty of the Council to look after the streets and protect them. He pointed out that the Company was a private organization, and had no right to open the streets without the permission of the Council. Fortunately, up to a recent date there had not been much friction between the Council and the Company, because the Council had been easy-going; but they now recognized that something should be paid for the constant damage done by the Company. Up to last August, the Council were unable to get a single satisfactory answer as to what the Company would pay as a licence, or for repairs. He gave the Company notice that, unless the question of privilege was settled, no further permission would be given to open the streets; and the Surveyor wrote in similar terms. Despite this, the Company took up the flags in the Market Place, and wrote a note to the Surveyor which reached him after the work was completed. Mr. Heslop said he believed it was the wish of the majority of the Council that these proceedings should not take place; and he questioned the right of their Clerk to prosecute without being expressly authorized to do so. The Bench, however, decided that Mr. Dawson was in order. Evidence was then given that no permission to open the streets had been granted later than the beginning of August, but that on the 10th of that month the ground was broken up by the Company. Mr. Heslop said his contention was that the Company had a right granted to them in 1834 to lay gas-mains; and they had up to 1900 enjoyed this right without being charged with any repairs, and without paying rent or experiencing any hindrance. They thus gained a right by prescription. At this point, the Chairman stopped the case, and said the Magistrates thought the parties might come to terms. If not, they suggested that a legal arbitrator should settle the difference. Subsequently, the hearing was adjourned for a fortnight.

Assessment of the Liverpool Water-Works.

At a special sitting of the Llanfyllin Petty Sessions last Wednesday, the Justices reconsidered the question of the liability of the Liverpool Corporation for certain arrears of rates in respect of their water undertaking in the parish of Llanwddyn, covering the years 1896 to 1901. The matter was originally before the Court in January last, when the Justices decided in favour of the Overseers, ordering the payment of £667 arrears on the water-works at Lake Vyrnwy, from Sept. 30, 1896, to Sept. 29, 1901, and £70 costs. The Corporation took the matter to the High Court, where the decision of the Magistrates was reversed, and the question remitted back for rehearing. At the hearing of the appeal, the Lord Chief Justice pointed out that Mr. Justice Channell, who had been figuring the matter out, had come to the conclusion that, for the purpose of the case before the Court, there was only a sum of £275, for which a distress warrant would issue. The Court therefore remitted the matter back to the Justices to consider whether there was any answer with regard to this sum of £275. After a lengthy argument, the Justices last Wednesday decided that they could only go into the question of the sum of £275, the arrears which had accrued since October, 1899, and not into the question of the earlier rates, inasmuch as the Divisional Court had ruled as to this. They ordered a warrant to issue for the £275; directing that each party should bear their own costs of the previous hearing, and that the Corporation should bear the costs of that day, which were fixed at £60. The Bench, on the application of Counsel for the Corporation, decided to state another case for the King's Bench Division.

Strange Claim Against a Water Company.

At the Brompton County Court, last Tuesday, before his Honour Judge Stonor, Mr. Charles Dickhaus, of No. 18, Radnor Street, Chelsea, sued the Chelsea Water Company for £1 for loss and inconvenience sustained through having a water supply cut off by them without reasonable cause and proper warning. The plaintiff personally conducted his case; and Mr. A. H. Chaytor appeared for the Company. The plaintiff stated that he had been summoned at the Kensington Petty Sessions, at the instance of the Chelsea Borough Council, for having no water supply to his house. On explaining to the Bench that the trouble was due to the conduct of one of the rate collectors, the Chairman said that the turning off of the water was a most arbitray proceeding on the part of the Company. The fact was that between the collector in question and himself there had been ill-feeling for some years. Instead of being served with the usual quarterly notices to pay the rate, the custom of the Company had been to send only the final notice, with a warning that if the rate was not paid within a specified time the water would be cut off. He paid his water-rate up to the 29th of September last, as his receipt would show; but on the 2nd of October the water was cut off without reasonable warning being given. No previous demand for the money was made. Mr. Chaytor explained that as the rate was not paid by the time specified upon the notice, the water was turned off; but subsequently it was found that someone had turned it on again. The plaintiff said it was his own stopcock, and he supposed he could turn it on if he pleased. In answer to Mr. Chaytor, he admitted that when he paid the rate he was asked for an additional 2s. in respect of the Company turning the water off and on again. This he refused to pay, because he did not require the Company's men to touch his stopcock. His Honour said no doubt the Company had a right to claim the rate in advance, although it would seem, by their notice, that they asked for the payment as a favour. The wording was a little misleading, as they "request the favour of a remittance." It was clear that the plaintiff had no claim. Plaintiff said he had been most shamefully treated by the Company. His Honour remarked that, being a foreigner and blind, he ought to have been treated differently. He must, however, find for the Company, but without costs.

The London Water Area.—As the result of a motion by Mr. Rae, the Member for Gloucester, a return has just been issued showing the population and rateable and assessable values of the boroughs and urban districts to be represented on the proposed Water Board for London. Particulars are also given relating to the boroughs, urban districts, and rural districts within the Metropolitan water area which are either to be excluded from the area or to be unrepresented on the Board; also the proportion which the population and the rateable value of each district bears to the total population and the total rateable value respectively of the whole of the proposed water area.

MISCELLANEOUS NEWS.

SOUTH LONDON GAS-WORKERS AND THE WAR.

A Result of Combined Effort.

There are very few gas-workers—from the highest to the lowest—of the United Kingdom that have not had, in addition to patriotic sentiment, a very close personal interest in the war in South Africa through the calling away of comrades or fellow-workers forming part of the great military reserve force of the country, or the volunteering for active service of others. And, moreover, there are very few gas workers who did not do their part cheerfully and generously, according to their means, in looking after the wants of the wives and children of their absent friends and fellow-workers; and in this noble work the men were liberally aided by their employers and officers. The war, apart from its successful issue to the country, has had other good effects. It has, in the great industrial centres, drawn tighter the bonds of unity between man and man; it has shown that the owner of the horny or work-begrimed hand has, under his rough working-day coat, a stout and sympathetic heart; and it has proved to the world the powerful influence in doing good of the combination of the toilers' mites.

We have only to look to what has been done by the gas workers of the country for proof of all this. Information as to what has been going on in several cases has reached us indirectly, and occasionally directly. A brilliant example is supplied by the spontaneous efforts of the men, and hearty co-operation of the Directors and officers, of the South Metropolitan and Crystal Palace District Gas Companies; and a welcoming-home of the reservists and volunteers of these Companies last Wednesday affords an opportunity of giving an interesting little sketch of one of the best pieces of co-operative aid that, we venture to think, the gas industry has ever witnessed. Numbers, it is true, told; but numbers, without the will and good-heartedness here shown, would not have produced a similar result. The substantial shielding from want of the wives and children of their soldier comrades by the co-operation of the workers in the case of the two Companies mentioned must be acknowledged to be an effect of the profit-sharing system. The many thousands of pounds of stock which the men hold in the two concerns is the accumulation of small amounts of bonus; and from that they have learnt a lesson as to what united effort can accomplish.

The particulars of this highly successful endeavour of the gas workers of South London will be presented by outlining what took place at the welcoming-home festivities at the Crystal Palace last Wednesday. The Chairman (Sir George Livesey) and the Directors of the two Companies entered most thoroughly into their men's action in connection with the work of financially protecting their absent comrades' dependents; and the two Boards, we believe, joined hands in making the expense of Wednesday's welcome a personal matter. The central feature of the celebration was a dinner in the new restaurant at the Palace; and, just before two o'clock, the company seated at the tables numbered about 400. Sir George Livesey, as Chairman, occupied the seat at the head of the centre table. With him and at the heads of the other tables were most of the Directors of the two Companies, and the several officials—including Mr. Charles Carpenter, the Chief Engineer of the South Metropolitan Company, Mr. Frank Bush, the Secretary, Mr. S. Y. Shoubridge, the Engineer of the Crystal Palace Gas Company, and Mr. Charles M. Ohren, the Secretary, as well as the Station Engineers of the first-named Company. There were also a few guests, among whom were Mr. W. G. Bradshaw, the Chairman of the Commercial Gas Company, Mr. Walter Hunter, a Director, and Mr. H. E. Jones, the Engineer; Colonel J. S. Young, the Secretary to the Royal Patriotic Fund, was also present; and Mr. Magnus Ohren, interested in the concerns of the Crystal Palace Gas Company as keenly as in the long years of his service in the Secretaryship, came out to join in the joy of the occasion. The men home from the front numbered about 135; and the workmen of the two Companies were represented by their Profit-Sharing Committees and specially chosen delegates. Several of the officers and most of the men were accompanied by their wives.

The Directors' instructions as to a bountiful dinner being provided were duly fulfilled by the caterers; and it could not have failed to give enjoyment to everyone present. At the close, there were several speeches and incidents appropriate to such a special event. The first words that fell from Sir George were an expression of sympathy for the relatives of "our friends and comrades" who had not returned home. He mentioned that about 130 of the South Metropolitan men went out as reservists, volunteers, or volunteer ambulance men; and of them two were killed and six died of enteric fever. In the case of the Crystal Palace Gas Company's men, five went out, and one was killed in the Barberton railway accident. With the relatives of these departed friends, the large company showed their sympathy by silently rising. A loyal expression of regard and good wishes for the health of the King followed; and this paved the way for the toast of the day, "The Companies' Reservists and Volunteers and their Wives." The Chairman's speech was full of hearty welcome home and sympathy with the wives in the anxious times they had experienced. The toast was very enthusiastically honoured; and response was made on behalf of the reservists by Mr. W. Finch and for the volunteers and volunteer ambulance men by Mr. T. W. Manley. If these were true specimens of the men who left home to fight for their country's honour, they are not the "absent-minded beggars" depicted in Rudyard Kipling's song; for they told of how their thoughts turned constantly to "the wife and little family" at home; and of how their work was lightened by the knowledge that those belonging to them were being protected and cared for by their fellow-workers and employers. Following their speeches, there was considerable enthusiasm over the receipt and reading by the Chairman of a telegram from Lord Roberts, in which his lordship was pleased to state his high appreciation of the good work that had been carried on by the two Companies and their employees in connection with their reservists' funds, and congratulated them all heartily upon the success that had attended their efforts.

Then the Chairman told the story of how the Companies' reservist funds were started, of their success, and of the good they had wrought. The origin of the funds was the spontaneous act of the men themselves; and, as every spring has its source, so these great funds arose out of a conversation between Mr. William Harvey (one of the foremen at the Old Kent Road works) and his wife. The proposal, the Chairman said, was at once taken up, a number of the men formed themselves into a Committee, with Mr. W. C. Beard as Chairman and Mr. E. W. Gilbert as Hon. Secretary. The workmen unanimously agreed that they should levy themselves with 1d. a week per man; and if more was wanted (as it was) with 2d. per man. The Company agreed to contribute an amount equal to the total subscribed by the men. The results stated by Sir George were briefly these: From the South Metropolitan Company there went out 116 reservists, 6 yeomanry, 2 volunteers, and 7 of the St. John Ambulance Brigade—about 130 men altogether. The workmen during the time the fund ran subscribed altogether £2895 18s. 4d.; the Company an equal amount; the Directors, by monthly contributions, £186; the officers £243 16s.; and there was a sum of £28 19s. 3d. for interest—making a grand total of £6250 11s. 11d. Weekly payments were made amounting to £6068. The reservists' wives were paid 10s. a week; each child (under 14 years) 2s.; and dependent parents, 10s. The Committee's travelling expenses amounted to £23 5s. 9d.; and this was all the expense incurred by the Committee. Their services were given gratuitously; and the cost of printing, stationery, and postage was defrayed by the Company When the fund was dissolved, there was a balance of £158 16s., which has been handed over to the Company for the widows. Besides this, the Chairman thought he could promise, on behalf of the workmen, that they would do all that was necessary in the way of looking after the widows in the future. In the case of the Crystal Palace Gas Company, only five men went out; but the workmen of that Company acted in precisely the same way. A Committee of the men was formed; and they contributed £206 15s. 9d. The Company subscribed an equal amount; and, with £5 2s. 6d. interest, the fund amounted to £418 14s. The money was distributed in the same way; and there was a balance in hand to provide for the widow of the man who lost his life. With Sir George, it will be agreed that all this is something of which the Companies may be proud. It was the spontaneous act of the men; and the work was carried out by them in a most admirable manner. Special mention was made by the Chairman of the work of the Secretary of the South Metropolitan fund (Mr. Gilbert).

Then came a stirring speech from Colonel J. S. Young, in which he referred to the good work in which he is engaged, both in connection with the Royal Patriotic Fund and the St. John Ambulance Association. He urged the men to use their education, and lessons gained from the war, for good in the future. Following the gallant Colonel was Mr. W. C. Beard, the Chairman of the Fund Committee of the South Metropolitan Gas Company, who asked the Chairman to present to Mr. Gilbert, on behalf of the Committee and the reservists, a beautiful gold watch. The Chairman did so, accompanying the act by a graceful allusion to the good qualities of which Mr. Gilbert had shown himself possessed.

The presence of the Profit-Sharing Committees gave the Chairman an opportunity of saying a few words showing the progress made in this particular direction. From his remarks, it appears that the total holding in the concern of the 4000 or so men of the South Metropolitan Company is now £160,000, or an average £40. Of course, some of the men hold upwards of £100; and yet, as Sir George truly says, many of them would not have had anything had it not been for the system. It is very gratifying to learn that, of the bonus declared last June by the Company, only 14 per cent. of the withdrawable part was withdrawn; and, in the case of the Crystal Palace Gas Company, only 3 per cent. The men of the latter Company have £15,000 invested in it, or an average of £30 per man. On this profit-sharing question, "it seems" to Mr. Charles Hunt (who also made a few remarks) "that of all systems this is the best calculated, when it can be applied, to bind together with one common interest the whole of the employees of an industrial undertaking." He hopes, in time, the Crystal Palace Gas Company will adopt in its entirety the system as developed by the Chairman in the case of the South Metropolitan Company.

A surprise was in store for the Chairman at this stage of the proceedings, in the shape of an address from the whole of the men of the larger Company. It was beautifully engrossed on vellum, and handsomely framed. The pleasant duty of representing the men in this matter fell upon Mr. H. Austin, one of the Workmen Directors, and very eloquently he accomplished his task. The address sincerely expressed the men's appreciation of the work Sir George has done for the amelioration and improvement of the position in life of the Company's employees, and of his strenuous endeavours extended over many years in promoting the spirit of fellowship and goodwill between employer and employed.

Feelingly, Sir George responded to this renewed act of kindness and goodwill, and ungrudgingly he passed on to others much of the credit for what has been accomplished. Had he not, he said, been most loyally and most thoroughly supported by all his colleagues (he said this of both Companies), and by the officers, foremen, and workmen, he could have done nothing. In the course of further reply, he took occasion to remark that unkind things were said about gas people. It was stated in the London County Council the other day that if it was known that the gas of the London Companies was not tested on Sundays, it would become a "royal day for cheating." He (Sir George) cared nothing for such a charge from that quarter, but what he did care about and what he was prepared to be judged by, was the opinion of those they served, and who knew them best. And if the consumers of both Companies could, and he knew they could do no other, bear testimony, that they had been served honestly and fairly, and if the employees could say the Directors had tried to do justice to them and had treated them kindly, they were content to be judged by them; and he accepted the address as a further proof of the employees' judgment.

There was considerable applause at the end of the Chairman's

speech; and the company then separated. Later in the day they returned for tea; and everyone present appeared to have had a very happy time. The tale of how the Directors of the two Companies received home their soldier workmen will be told by the latter many years hence.

METROPOLIS GAS SUPPLY.

The London County Council and the Gaslight and Coke Company.

At the Meeting of the London County Council to-day, the Parliamentary Committee will present the following report on the Bill they propose to promote next session, as notified in the "JOURNAL" last week, to amend the Acts relating to the Gaslight and Coke Company.

In accordance with the instructions given to us by the Council on the 10th of June last, we have prepared this Bill to provide (*a*) for a reduction in the Company's existing standard price from 3s. 9d. per 1000 cubic feet to 3s. 3d., coupled with a scale of increase or decrease of dividend equivalent to the secondary scale recommended by Sir James Rankin's Committee of 1899; (*b*) for a reduction in the standard of illuminating power of gas supplied by the Company from 16 to 14 candle power, together with a reduction of 2d. in the standard price, which would thus become 3s. 1d.; and (*c*) for one half of the Company's clear profits, if any, after paying a dividend of 4 per cent. per annum, to be carried to a fund to be applied to the redemption of obsolete capital.

An essential feature of this Bill is that it is based practically entirely upon the recommendations of Sir James Rankin's Committee of 1889, which it will be remembered went fully into the question of the Company's position and management, and the steps which should be taken to obtain some reduction in the present high price (3s. per 1000 cubic feet) charged by the Company to consumers in the district north of the River Thames. So far as concerns gas used for public lighting, which the Company are now under obligation to supply at a price not greater than the price (at present 2s. 3d.) charged by the South Metropolitan Gas Company to ordinary consumers, the Bill does not propose in any way to interfere with the Company's existing obligations in a manner prejudicial to the interests of public authorities concerned. On the contrary, the reduction of illuminating power to 14-candle gas should result in a lowering of the Company's charge for public lighting from 2s. 3d. to 2s. 1d.

The Bill is the direct outcome of the conference of Local Authorities for districts in the Company's area north of the Thames held at the County Hall on the 7th of March last, which passed resolutions urging the Council, in conjunction with the Corporation of the City of London or otherwise, to promote legislation, failing action on the part of the Board of Trade. The President of the Board of Trade has intimated that, while not being himself able to promote legislation on the subject, he will be happy to consider any Bill which may be put forward on behalf of the Local Authorities. We have accordingly given directions for a copy of the Bill to be sent to the President of the Board for his consideration; and we hope that he may see his way to advise His Majesty's Government to give it their support.

We are in communication with the City Corporation with regard to the Bill; and, inasmuch as the views of the Council and the Corporation on the subject are in no way antagonistic, we hope that our negotiations will result in the two authorities acting in conjunction in this matter. We have given directions for copies of the Bill to be circulated to the members of the Council; and, in view of the possibility of amendments in detail being suggested by the Board of Trade or the City Corporation, we ask the Council to authorize us to make necessary alterations in the Bill. We recommend—"That the Gaslight and Coke Company's Acts Amendment Bill be approved; that the seal of the Council be affixed to a petition for leave to bring in the Bill; and that the Bill and petition be deposited, pursuant to the Standing Orders of Parliament, with such necessary alterations (if any) in the Bill as the Parliamentary Committee may consider desirable."

MESSRS. R. & J. DEMPSTER AND THEIR EMPLOYEES.

Celebrating the Coming of Age of Mr. Charles Dempster.

The employees of Messrs. R. & J. Dempster, Limited, of Newton Heath, Manchester, were on Friday last, at the invitation of Mr. and Mrs. John Dempster, entertained at the Belle Vue Gardens, on the occasion of celebrating the Coming of Age of their son, Mr. Charles Dempster. The proceedings commenced early in the day with a long and varied programme of sports; useful and valuable prizes being awarded to the successful competitors. Unfortunately, wretched weather somewhat marred the full enjoyment of this portion of the celebrations; but with ample covered space afforded by the gardens, everything passed off exceedingly well. After the sports, the employees, the heads of departments, with Messrs. R. & J. Dempster and the members of their respective families, sat down to dinner in the dining-hall—Mr. Robert Dempster, the Chairman of the Company, presiding. The toast of "The King" having been duly honoured, Mr. Hepworth, the General Works Manager, proposed the health of Mr. Charles Dempster, whose Coming of Age they had met to celebrate. He said they all knew Mr. Charles Dempster so well, and he was so highly esteemed in the works, in the active duties of which he had taken a part for several years, that it needed very few words to commend the toast to their heartiest appreciation. He had known him from boyhood; and through all these years he had known nothing but good of him. Greater responsibilities would now devolve upon him; and he (the speaker) could only hope that he would so discharge his new duties as to give the highest satisfaction to all with whom he came in contact, and that the success of his business career might exceed even that of his father. The toast having been most enthusiastically received, Mr. Charles Dempster, in responding, said he was no stranger to the employees of the firm, many of whom had been with them ever since his uncle and his father started their new works in Manchester; and he thanked them exceedingly for the very flattering manner in which the toast of his health had been received. His father had that day given him an interest in the business; and he hoped that the very good relationship which had existed in the past would continue in the future. He certainly should do his best to secure their continued goodwill. He must thank Mr. Hepworth for his very kind remarks, and Mr. Scott for the excellent arrangements he had made for their entertainment that day. Afterwards an excellent concert in the dining-hall and dancing in the ball-room filled up the remainder of a very full round of festivities.

INCANDESCENT GAS LIGHTING FOR CHURCHES.

A Successful Installation at Scarborough.

Readers of the "JOURNAL" are aware of the success which has attended Mr. J. H. Troughton's efforts to improve the lighting of the churches at Newmarket by the introduction of the incandescent gas system. We are pleased to learn that Mr. Alexander Allan, the Manager and Secretary of the Scarborough Gas Company, has been equally successful at Christ Church in that town. The congregation had an opportunity, on Sunday, the 23rd ult., of witnessing the new system in operation for the first time; and general satisfaction was expressed. The details of the changes effected are as follows: In the chancel, 26 flat-flame burners have been replaced by two clusters of three No. 4 incandescent burners; in the nave, 39 flat-flames have been replaced by 23 No. 4 "Christiania" incandescents; in the gallery, ten clusters of two incandescents have replaced the 106 flat-flames; and the staircase has been furnished with a cluster of two incandescent burners in place of three flat-flames. The lighting of the church was done from heavy wrought iron ornamental brackets fixed to the stone pillars. These brackets Mr. Allan has utilized again, and where the triple cluster lights, of 360-candle power, are fixed, there was previously a large ball on the bracket, and on the ball were two semicircles of lights crossing each other, having seven flat-flame burners on each half circle. The double-cluster burners, of 240-candle power, take the place of a semicircle of lights of seven flat-flame burners. The whole of the new lights are furnished by Sugg's patent "Christiania" incandescent gas-burners, with double annealed albatrine "Christiania" globes from 7 inches in diameter for the single lights up to 12 inches for the triple-cluster lights. These globes give a soft diffusive light. The 174 flat flame burners furnished a total illuminating effect of about 2088-candle power; whereas the new incandescent lights are of more than 6000-candle power, or three times the amount of light for about one-half the quantity of gas formerly used. There has been a great improvement in the atmosphere of the church since the introduction of the new system of lighting, the total cost of which will not exceed £50—the Company undertaking the maintenance of the mantles and the cleaning of the burners. The lighting of Christ Church has given so much satisfaction, that a proposal is under consideration to introduce the incandescent system at the Parish Church.

HEYWOOD GAS FATALITY.

On Monday of last week an inquest was held at Heywood, by Mr. F. N. Molesworth, the District Coroner, on the bodies of Mrs. Taylor and an adopted son, who were suffocated by gas under circumstances briefly recorded in last week's "JOURNAL." The two principal witnesses were a Corporation meter inspector, named James Pickup, and John H. Taylor, the husband of the deceased woman. The former, in his evidence, said that the Taylors had two meters in their house, but last April notice was given that they intended to discontinue the use of gas for lighting, and he accordingly disconnected "in the ordinary course" the meter employed for this purpose. That is to say, he uncoupled the meter, and left it in position; screwing a cap on the main pipe. This cap, he said, would require a pair of hand-pliers to unscrew it; and if it had not been tampered with, everything would have been secure. Under these circumstances, he paid no further attention to the meter, though had he looked at it when inspecting the one used for cooking purposes, he would, of course, have seen that someone was taking gas there. The Coroner said anybody could take the cap off and couple up the meter; and he asked if there was not some means of cutting the gas off to prevent tampering with it. Witness replied that the only way was to cut the main off outside. The Coroner remarked that he should have thought the pipe could have been sealed in some way with wax. It should be made rather difficult, so that people would have to use something more than an ordinary pair of pliers to take the cap off. People, he thought, would scruple before they broke a seal. Witness said it was an easy matter to break a seal, if anyone was determined. A Juryman: The point seems to be that there is a laxity and want of diligence and foresight on the part of the Corporation officials in not inspecting the meters. The Coroner: You can hardly say that. You would have thought they would inspect; but you can hardly call it laxity. It is the custom. The Juryman: It is a bad custom. Mr. Taylor, who only returned from South Africa in August, said they were burning lamps when he got back, as the gas-pipes wanted repairing. He only used the gas for lighting twice; and on these occasions he coupled up the meter. Witness denied that there was a cap on the pipe, and said that there was nothing to prevent the meter being coupled up. He did not know he ought to have given notice to the Corporation, as he was connected with the meter, and everything that went through he would have to pay for. On the night of the accident a lamp shade was broken, and he thereupon connected the meter up and burnt gas. Before going to bed, he disconnected the pipes again; but he must have failed to turn off the main tap, so that the gas poured into the house straight away, without going through the meter at all. He understood nothing about meters; and the reason he disconnected

the pipes at night was because he was afraid of further leakage in the house. The Coroner, in addressing the Jury, said there could be no doubt as to the cause of death—viz., asphyxia from gas fumes. The way the gas had escaped had been made extremely clear by Mr. Taylor's evidence. It was the result of ignorance. Apparently, he left the gas turned on at the tap, and disconnected the inlet-pipe from the meter. This meant that the whole of the gas was passing through the pipe, and that, instead of going into the meter, it went into the house. It filled the house with gas fumes; and, unfortunately, before this was found out, Mrs. Taylor and one little boy who lived with the family succumbed. The Jury, he thought, would have no difficulty in returning a verdict of "Accidental death." He went on to say that it was advisable that the meters should be periodically inspected. In this case, the man visited the house to inspect another meter; and it was rather astonishing that, out of pure curiosity, he did not look at the disconnected meter, to see that it was all right. He should have thought that, when the Corporation disconnected a meter, they would have taken away the connecting pipe, so that a new pipe would be needed before anyone could connect up the meter. At the same time, the fact that the meter was not inspected by the Corporation did not affect the case. This was a matter for the Corporation. The Foreman said the Jury seemed quite in accord with the verdict suggested by the Coroner. Several of them, however, wished to add the recommendation that in future when the Corporation disconnected meters they should seal the cap in some way so as to ensure it against being tampered with. The Coroner promised to see that this recommendation was forwarded to the proper quarter.

PUBLIC LIGHTING QUESTION AT NUNEATON.

A Settlement Arrived At.

The difficulty arising over the public lighting of Nuneaton between the Gas Company and the Urban District Council (*ante*, p. 1355) has at last been settled. At the meeting on Wednesday, the Highways Committee reported that the Special Committee appointed to meet the Directors of the Gas Company with the view of arranging satisfactory terms did so on the 24th ult., and the following are the best they could obtain: (1) The contract to be from year to year (for a period of twelve months) from Nov. 30, 1902, to be determinable by three calendar months' notice in writing by either party, expiring on Nov. 30, 1903, and on that day in any subsequent year. (2) The prices for the lamps to be charged as follows: Lamps with "C" burners in ordinary lanterns and No. 2 and No. 3 Kern burners in ditto, £3 2s. 6d. each; lamps with No. 4 Kern burner, £3 12s. each; lamps with No. 5 Kern burner in Brixton lanterns, at £3 15s. each; lamps with No. 4 Kern burners in "arc" lanterns, £4 6s. each; and lamps with two No. 4 Kern burners in special lanterns, £5 15s. each. The Council to be at liberty to require the removal of any existing lamp or lamps to another part of the gas-mains on paying the cost of such removal; the Company not fixing any additional lamps with No. 3 Kern burners at the price of £3 2s. 6d. per annum. The Committee advised the Council to accept these terms. Mr. Horton (Chairman) explained that the Committee met the Directors of the Company, and he thought they did as well as could be expected. Mr. Bates (the Vice-Chairman) remarked that he thought the contract was satisfactory to everyone. The terms were accepted.

BRYNMAWR COUNCIL AND THE GAS COMPANY.

Disputed Gas Accounts and Claim for Damaged Mains.

At the last Monthly Meeting of the Brynmawr District Council, some time was spent considering a report of a Committee appointed to deal with the charges made by the Gas Company for the gas consumed in the six months ending in June, and also with their claims for gas lost by leakage and damaged mains. The amount of the bill for the March quarter was £112 15s. 8d.; and the Committee succeeded in reducing it to £74 2s., or a difference of £38 13s. 8d. The next bill—for the June quarter—the Committee found more difficult to deal with; the readings of the meters by the Surveyor and by the Gas Company's Manager varying considerably. It was pointed out to the Directors that as the lighting period for the June quarter extended to only about half that of the March one, and the time each evening was about half that of an evening in that quarter, a fair balance would be struck by dividing the March quarter account by four. This reduced the amount from £47 4s. to £18 10s. 6d., or 9d. less than the account as worked out by the Surveyor's readings. The Directors eventually accepted this amount; leaving a balance in favour of the Council of £28 13s. 6d. The next matter in dispute was a claim of £27 5s. 5d. for leakage of gas owing to uncapped taps. The Company pointed out that, according to the terms of agreement with the Company, the Council were not responsible for any leakage, and in fact it was not their business to cap the pipes when the stopped lighting came. The Committee's contention was accepted, and the amount struck out. The last item in dispute was the damaging of the gas-mains by the steam-roller, for which a claim of £11 18s. was made. The Committee arranged this matter by the Council paying £7. The total difference, not including discounts, was £99 10s. 7d.; with discounts of £106 17s. 8d.—the amount being equivalent to a 2d. rate for six months. It was resolved that the Committee, with the assistance of the Clerk and Surveyor, should go further into the matter, by investigating the public lighting accounts for the past six years; and the Committee were thanked for their services.

The Bramham Gas Company, Limited, has been registered, with a capital of £1000, in £1 shares, to acquire, in virtue of certain agreements, the undertaking of the Bramham Consumers' Gas Company, Limited (in liquidation), and to supply gas to the village of Bramham, near Tadcaster, Yorkshire.

QUESTION OF FORGED TRANSFERS.

The discussion of this subject was continued in "The Times" on Monday last week, by a reply from Mr. H. D. Ellis to the letter of "A Banker" given in the "JOURNAL" for the 25th ult. (p. 1414). In the course of his reply, Mr. Ellis said: "The letter of 'A Banker' scarcely seems to need a rejoinder from me, for it does not advance the discussion. He harks back to the ancient myth that a company must necessarily have in its possession a specimen signature of every stockholder. Barton's case, as I pointed out, exposes this fiction. Then he goes on to compare the relationship of banker and customer with the relationship of company and stockholder. They cannot be compared; they are entirely dissimilar. A banker is a bailee of another's cash, and the customer is his creditor for the amount of it. A stockholder is not a creditor, but is a component member of the corporate body of the company. But a pretended transferee under a forged transfer is a non-existent person so far as the company is concerned. They have no duty to him either as 'custodians of his stock' or as anything else. It is not his stock, for a forged transfer is absolutely void. The whole transaction is void, and his name must be removed from the company's register on to which it had come by fraud."

In connection with this subject, it may be of interest to some of our readers to see the precautions taken by an important Gas Company in respect of the Forged Transfers Act. On notice being received in regard to a transfer, the Secretary informs the transferor thereof, in a circular worded as follows:—

*To*_____

Transfer of Stock.

*Yourself*_____ *to*_____

I beg to inform you that a Transfer, conveying £ General Capital Stock, as above, has been forwarded to this Office for registration. Please sign and return the enclosed form acknowledging receipt of this notice.

On the form enclosed the transferor acknowledges the receipt of the above notice, and certifies by his signature that the transfer is in order. In a postscript his attention is called to the fact that the transfer will not be executed until the acknowledgment is received. Where stock is registered in more than one name, notice is sent to each person, and an acknowledgment required from him. The following is the form of notice sent to the stockbroker:—

Transfer of £_____ of General Capital [or Debenture] Stock.

_____ *to*_____

Sir,—I hereby acknowledge receipt of transfer as above, together with Stock Certificate, which shall be duly registered, and a new Certificate sent you after the next Meeting of my Board, viz., on the conditionally on our hearing from the transferor, to whom a form of acknowledgment, for return to this office, has been sent, that the transfer is in order.

Yours obediently,

The Secretary of a large Provincial Gas Company writes to point out that in some cases companies never get the signature of shareholders. For instance, upon the death of a shareholder, the stock is transferred into the names of the executors by exhibition of probate and declaration; no signature of the executors being needed. Again, when stock is sold by auction, large parcels are often bought by private individuals, and especially by stockbrokers, and afterwards allotted by them to different persons, in whose names the stock is registered, but whose signatures are not required. The writer adds that it would be difficult to determine, even if the original signature were at hand, the genuineness of a further signature. People who risk forging are usually very careful to perfectly imitate the name they forge.

HARBOUR LIGHTING BY INCANDESCENT LAMPS.

Encouragement to the use of incandescent mantles in exposed positions is given in a statement which the Wellington (N.Z.) Gas Company recently forwarded to the local Manager of the Welsbach Light Company of Australasia, Limited, and a copy of which has been sent to us by Mr. A. E. Cohen, the Managing Director, of 2, Bury Street, St. Mary Axe, E.C. The statement refers to the number of mantles used, during the quarter ending Sept. 30 last, on 527 burners in the lighting of Wellington Harbour, which has the reputation of being the most windy spot on the New Zealand coast. The quarter in question is also one in which the hours of burning are longest. Now during that quarter, the Gas Company state that the mantles used on the 527 burners only numbered 265. This works out to (within six) an average of 2 mantles per burner per annum, which is an excellent result and very encouraging. On reference to a tabulated record which has also been supplied, showing the mantles used on each lamp, it is seen that the figures fluctuate from 0 to 5 and 6, and in one case to 9; but a great majority of the lamps only exhibit a consumption of 0, 1, 2, and 3 mantles. In the case of the lamps using the larger number, it is explained by the fact that sometimes the hydraulic lights swing round, and knock globe and mantles to pieces. However, the average is very satisfactory for such a position; and it would be interesting to compare it with similar experience in this country.

Explosion at an Embassy.—A slight explosion of gas occurred at the British Embassy in Rome on Monday morning last week. Three servants were injured, but only slightly, and no serious damage was done to the building. The explosion took place in an underground room in which the servants were working; and it is reported that they were trying to locate an escape of gas in the way which is unfortunately still customary with a certain class of people—viz., by means of a lighted candle. Several windows were broken—the fragments being carried to the opposite side of the street; and there was a slight outbreak of fire, which was promptly extinguished by the firemen.

REPAYING GAS-WORKS LOANS OUT OF THE RATES.

The Urban District Council of East Dereham being wishful to borrow a sum of £1500 for the purpose of extending their mains and providing new plant for the gas-works, Mr. J. C. Pottinger attended on Wednesday last, on behalf of the Local Government Board, to hold an inquiry. The Clerk (Mr. B. H. Vores) said the work had already been commenced, and £602 had been paid. Up to last year, the whole of the instalments on the loan had been paid out of the district rate account; the interest only being charged to the gas-works account. The Inspector asked why the instalments were paid out of the rates, to which the Clerk replied that it was done at the direction of the Auditor. They should have been paid out of the profits of the gas-works, as far as those profits extended; but when they took the works over the profits were not even sufficient to pay the interest, so the Auditor directed that the instalments should be charged against the rates. The Inspector inquired when the Auditor gave that direction. The Clerk replied that he could not say; it was given before he was Clerk. In 1885, they had their first loan; and in 1888, they had a further loan of £6000 to build new works. It was somewhere about the latter date that the Auditor gave the directions referred to. Successive Auditors always let it go in the same way, until the last audit, when the Auditor directed him to charge the whole of the instalment against the gas-works account. They had paid out of the rates for gas-works loans a total of £6038. The Chairman of the Council (Mr. T. Cranmer) pointed out that the estimated value of the works was more than the total liability of the town. They were calculated to be worth £15,000; while the town's indebtedness was £13,000. The Gas Manager (Mr. A. Kitson) having given evidence as to the necessity for the expenditure of the money asked for, the inquiry closed.

SHIPLEY AND THE SUPPLY OF GAS TO SALTAIRE.

Negotiations have been proceeding between the Shipley District Council and the firm of Sir Titus Salt, Sons, and Co., for the purchase from the latter of the right to supply gas in Saltaire. The Council, however, were unable to agree to the price (£35,000) named; and the Company have written saying that the negotiations must now be considered at an end. At the meeting of the Council last week, Mr. J. Roberts remarked that he thought it was desirable that he should say a word or two about the matter, as there seemed to be an impression abroad that a price much too high had been asked for the rights of supply in Saltaire. He found, on making a comparison of the prices paid by the Bradford Corporation in their purchases of the Eccleshill, Airedale, North Bierley, and Clayton gas undertakings with the figure asked by the Saltaire firm, that the Bradford price was much the higher of the two. For the four undertakings, £431,145, had been paid for the right to supply 213 million cubic feet of gas per annum. The price paid averaged, in interest and sinking fund, 23½d. per 1000 cubic feet. The £35,000 asked by the Saltaire Company (which included £2700 for meters, stoves, and pipes) worked out at 12·46d. per 1000 cubic feet. The price offered by the Council to the Company was £32,000, which worked out to 11·3d., or something less than half the amount the Bradford Corporation would have to pay. A letter had been received from the Company offering to sell at the same rate as was paid by the Bradford Corporation for the Heaton and Frizinghall rights. On this basis, the Saltaire undertaking should have been worth £41,800. Mr. R. Lindley said every member of the Council would agree that the Company had not attempted to take advantage of the Council. It was necessary, however, that a reply should be given to the statements made by Mr. Roberts, or the Council would be convicted of being unable to manage their business. An attempt had been made to sell the rights at what the Company believed a fair price; but the Council had refused to buy because they considered the figure too high. Bradford gave them as goodwill for the right to supply Heaton £18,550; and the pipes, stoves, and meters were estimated to be worth £5800. This was a total of £24,350 for the right to supply 24 million cubic feet of gas. The right at Saltaire was for the supply of 27½ million cubic feet, and they called it 28 millions. At the same rate as in the Heaton case, the goodwill would amount to £21,641; and the stoves, &c., were estimated by the Company to be worth £7400—making a total of £29,041. They made what he considered a fair and equitable offer of £32,000. If they had bought the Saltaire rights, they would have had no works with them; and they could not get plant and ground for the making of 28 million cubic feet of gas at less than £15,000—making a total of £50,000, or 1s. 9½d. per 1000 cubic feet in interest and sinking fund. Mr. Roberts said the works at present in existence were abundantly sufficient; and it was not necessary to include the cost of them in the calculation.

Heavy Leakage of Gas at Ripon.—A report presented by the Manager (Mr. W. T. Lancaster) to the Ripon Gas Committee, dealing with the question of unaccounted-for gas, was considered by the City Council at their meeting last Tuesday. Mr. Lancaster pointed out that in the six months ended Sept. 30, out of a make of 14,605,400 cubic feet, the unaccounted-for gas amounted to 4,122,420 cubic feet. This was equal to 28·12 per cent., or, at 3s. 4d. per 1000 cubic feet, a loss on the half year of £687. Among the principal causes for this loss he mentioned faulty joints in the mains, corroded service-pipes, drilling mains for services, defective meters, condensation in the mains and services, public lamps passing more gas than estimated for, unsoundness of gasholders, &c. The question of leakage was an important factor, and every effort should be made to reduce the waste to a minimum—say, 6 per cent.—which would mean a saving of £1300 per annum. There were 16 miles of mains, the greater part of which, he understood, were new; and yet in the last six months there had been spent in wages out of revenue some £217 for repairing joints of new mains. He estimated that it would cost another £1200 before this work was completed. The Council authorized the repair of the mains.

WINDING UP OF THE DEVONPORT GAS COMPANY.

Distribution of the Assets.

The Final Meeting of the Shareholders of the Devonport Gas Company, for the purpose of approving of the statement of accounts and distributing the assets, was held last Tuesday—Mr. A. BENNEE, Chairman of the Board of Directors, presiding. A statement of accounts, of which an abstract was given in the "JOURNAL" for the 18th ult. (p. 1329), was submitted.

The CHAIRMAN said there had been no delay on the part of the Directors in calling the meeting. They had had to contend with numerous difficulties, but he believed the shareholders would admit that the Board had done the best that was possible for them. No doubt the property was worth a great deal more than the Devonport Corporation had paid for it. On the other hand, the Company had received a much larger amount than they thought some time ago they should get. Some of them were present at the statutory meeting of ratepayers when the Town Clerk said he intended to have the property, but should not pay anything like £100,000 for it. He said no gas company was entitled to receive anything like thirty years' purchase; and he brought in the 3000 disputed shares, and calculated the rate of dividend upon them at 6 instead of 10 per cent. Well, he had proved to be wrong. The Directors had not only to get the best return they could for the dividends, but had a large overdraft, because, the business having increased, they were bound to draw heavily on the bank. The contest before the House of Commons Committee and before the Umpire was prolonged; but, instead of getting less than £100,000, they had an award of £149,570. They also received from the Corporation for interest, less income-tax, the sum of £1868 7s. 1d. He considered the Act unfair in allowing the Corporation to have more or less control of the works before they finally took them over. Naturally enough, under these circumstances, every one of the employees looked upon himself, from the moment the agreement was signed, as being in the employ of the Corporation. The object was, of course, to get the property at as low a price as possible. However, the business was disposed of, the Directors had the money, and the meeting had to decide upon the method of distribution. He had been carefully through the whole of the accounts, and was satisfied that they were in proper order. There was a controversy between the Directors and the Corporation over the dividends. The Company claimed the full amount of the dividends until the time when they relinquished the undertaking. Ultimately, they collected £11,441 10s. 9d.; and Counsel thought they had a good case in regard to the retention of this money. They, however, decided to yield their claim to it, on the Corporation giving them their dividends. With regard to the arbitration costs, the Corporation agreed to pay £2000 towards them, and the Directors decided to accept this sum, which left £967 14s. 9d. for the Company to pay. He concluded by moving that the accounts be adopted.

Mr. W. J. WAYCOTT seconded the motion, and it was carried.

Some questions having been answered, it was decided that the balance remaining for distribution should be divided as follows:—£12,383 6s. 10d., the balance of the capital, at the rate of £1 5s. on each original share, and 15s. per share on the guaranteed shares; and £1528 14s. 6d., interest at the rate of 3s. 1d. per share on the original shares, and 2s. 1d. per share on the guaranteed shares—making £1 8s. 1d. on the original shares, and 17s. 1d. on the guaranteed shares.

The CHAIRMAN said there was a sum of about £500 due to the Board; and as there were Auditors' and other charges to be met, he suggested that the calculated balance of £1097 7s. 2d., which would remain after payment of the shareholders' claims, should be handed to the Directors. This also was agreed to.

ELECTRIC LIGHTING NOTES.

The Electric Lights at Ventnor.

Referring to the paragraph last week, in which allusion was made to the electric lighting at Ventnor, where the incandescent lamps were said to be of 32-candle power, a prominent resident in the town suggests that this high power was due to the vivid imagination of the members of the deputation, for he says the figures should be divided by 4 in order to get at the real illuminating effect produced by the lamps. It may be remembered that one of the speakers at the meeting of the Newton Abbot District Council at which the matter came up said the electric lights at Ventnor were not so good as the incandescent gas lights.

A Fire and a Mouse.

At last week's meeting of the Croydon County Council, the Electrical Engineer reported as to the recent fire at the electricity generating station, which damaged the plant and building to the extent of £3000, and had the effect of partially putting Croydon in the dark for a couple of nights. The cause of the fire, he considered, was shrouded in mystery; but as the charred and electrified body of a mouse had been found near the terminals of a high tension volt-meter, it was just possible that the little animal was connected with the origin of the outbreak. It is hoped that the Engineer will soon be able to remove this slur from the memory of the poor little rodent.

A New Experience at Birmingham.

Hitherto Birmingham has enjoyed immunity from the electric light street-box explosions which have been of more or less frequent occurrence in many places. Last week, however, the citizens had an experience which, the "Birmingham Post" remarks, "has brought closer home than ever the feeling of uneasy doubt as to the dangers attaching to the supply of electricity." The explosion occurred in a junction-box in Colmore Row, but fortunately at an early hour of the afternoon, when there were few pedestrians about; and thus no injury to life or limb resulted. It seems that there is some difficulty in accounting for the accident, as no evidence was found that either gas

or water had entered the box. An electric spark is put forward as the most probable cause; but the question of how this spark was formed has still to be settled.

Bermondsey's Electricity Scheme Criticized.

A short time ago, the Bermondsey Borough Council sanctioned the expenditure of £5780 on extensions of electric lighting to some of the public lamps in the borough. Their action has been adversely criticized by Mr. T. Ebenezer Pye, who, though not now, was for some years a South London ratepayer, in a letter to the "South London Press." He points out that, according to the information submitted to the Council, the ratepayers are to be mulcted in an additional annual estimated expense of £1484 for the maintenance of the new lights; also, presumably, in not less than another £289 per annum interest and repayment of loan in respect of the initial outlay. Deducting the present charges for gas lighting, which were stated to amount to £533, he makes out that an increased annual charge of £1240 is to be put upon the borough in respect of the public lighting, in addition to the capital outlay of nearly £6000. In view of these facts, he thinks two questions present themselves—first, does the borough require the increased illumination contemplated by these proposals? secondly, will the proposals, if carried out, secure the best and most efficient means for obtaining the estimated increased illumination? He shows, by figures taken from his pamphlet "A Ray of Light," that with gas at 3s. per 1000 cubic feet and electricity at 4d. per unit, the cost per 1000 candles for one hour of the two illuminants is as follows: High-power gas lighting, 1¼d.; electricity, 4d. Low-power gas lighting, 2¼d.; electricity, 15d. Mr. Pye concludes with the following remarks: "According to the figures submitted by the Bermondsey Surveyor (Mr. R. J. Angel), it has thus been abundantly proved that the Council have committed themselves to an expenditure for an illumination which his report shows could be (nay, is being) supplied from incandescent gas-lamps at less than half the cost now authorized. And if my figures be correct—and I guarantee their accuracy—the relative cost of the proposed electrical illumination is not less than four times what the charge for an equal illumination by gas would be."

GAS v. ELECTRICITY IN CAMBERWELL.

Proposal to Buy Out the Brush Company Defeated.

The Camberwell Town Hall was the scene of much excitement last Wednesday evening, when a motion to purchase the Brush Electric Lighting Company's undertaking in the district was discussed by the members of the Borough Council.

First of all a deputation was received from the Municipal Association, who presented a resolution unanimously adopted at one of the largest public meetings ever held in Camberwell in condemnation of the proposed purchase. The spokesman (Mr. G. S. Morgan) said the ratepayers felt that the Brush Company were all along aware that electric lighting could not pay in Camberwell, and had undertaken the work, which had been done with feverish haste, in the belief that the undertaking would be purchased by the Borough Council. Gas was cheaper in the district than in any other part of the kingdom, and it was impossible for electricity to successfully compete with it under the most favourable circumstances. He generally supported the principle of municipalization, but not in this case. Replying to questions, he said several shopkeepers and others who had tried electricity had given it up and returned to gas. Another deputation was received from the Ratepayers' Association, who also protested against the suggested purchase. The report of the delegates appointed by the Council to consider the question was presented. They did not make any recommendation.

Mr. TOMKINS moved—"That, subject to the site being a satisfactory one, and the mains laid found to be in good working order, an offer should be made to purchase the Brush Company's installation within the confines of the borough, together with all their rights in relation to their Camberwell Order, for a sum not exceeding £140,000, such offer to include the land and exclude the machinery at Wandsworth, with a proviso for the Company to supply the Council with current in bulk at 1¾d. per unit for a period not exceeding three years." He contended that the undertaking would pay at the end of four years.

Mr. WALLACE said it had by no means been proved that gas was at an end as an illuminant. The rates were now 8s. 4d. in the pound, and this mad scheme would, if adopted, increase them further.

Other gentlemen opposed the purchase, on the ground of the expense. With the erection of a generating station and the purchase of machinery, they argued, the total capital expenditure would be nearly a quarter-of-a-million.

The proposition was negatived by a large majority—only seven voting in its favour.

The reference to the delegates was discharged, and they were thanked for their report.

LAMBETH WATER-WORKS COMPANY.

The Ordinary Half-Yearly General Meeting of this Company was held at their Offices, Brixton Hill, last Tuesday, under the presidency of the Right Hon. Viscount HAMPDEN, G.C.M.G.

The SECRETARY (Mr. H. Wilkins) having read the notice calling the meeting,

The CHAIRMAN, in moving the adoption of the report, stated that, in considering the accounts for the past half year—to Sept. 30 last—regard must be had to two factors which had been prejudicial to the Company to a certain extent—namely, a wet and inclement season, and the expenses thrown upon them in defending their interests in

GAS AND WATER COMPANIES' STOCK AND SHARE LIST.

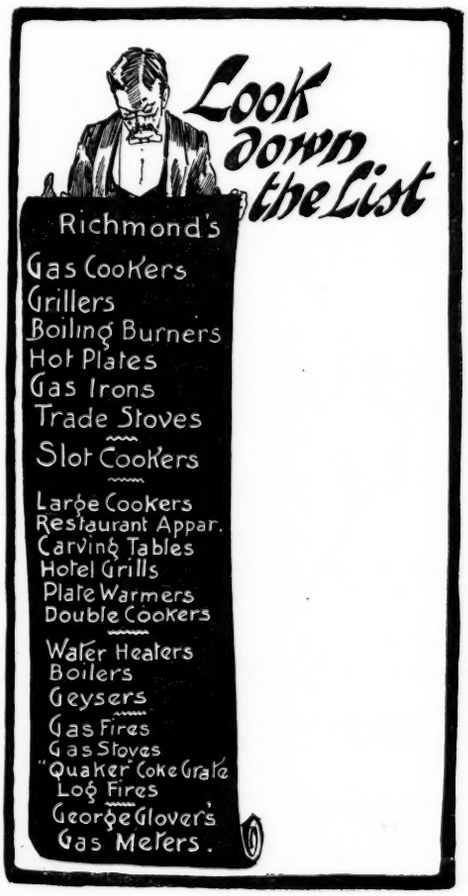
Referred to on p. 1462.

Issue.	Share.	When ex-Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p.c.	GAS COMPANIES.			£ s. d.
590,000	10	Oct. 15	10½	Alliance & Dublin 10 p.c.	18–19	..	5 10 6
100,000	10	,,	7½	Do. 7 p.c.	12½–13½	..	5 11 1
300,000	100	July 1	5	Australian 5 p.c. Deb. .	100–102	..	4 18 0
200,000	5	Nov. 13	6⅛	Bombay, Ltd. . . .	5½–6	..	5 8 4
40,000	5	,,	6⅛	Do. New, £4 paid	4–4½	..	5 15 6
380,000	Stk.	Aug. 14	12	Brentford Consolidated	247–252	–1	4 15 3
270,000	,,	,,	9	Do. New . . .	180–185	..	4 17 3
50,000	,,	,,	5	Do. 5 p.c. Pref. .	125–130	..	3 16 11
206,250	,,	June 17	4	Do. 4 p.c. Deb. .	111–114	..	3 10 2
220,000	Stk.	Sept. 11	16⅜	Brighton & Hove Orig.	207–212	..	5 1 5
246,320	,,	,,	18¾	Do. A. Ord. Stk. .	152–157	..	4 18 9
460,000	20	Sept. 26	10	British.	39½–40½	–½	4 18 9
50,000	10	Aug. 14	12	Bromley, Ord. 10 p.c. .	22–24	..	5 0 0
82,850	10	,,	9	Do. 7 p.c. . . .	18–20	..	4 10 0
500,000	10	Oct 15	7	Buenos Ayres (New) Ltd.	10–10½	..	6 13 4
250,000	Stk.	June 24	4	Do. 4 p.c. Deb.	93–95	..	4 4 3
150,000	20	July 11	8¼	Cagliari, Ltd. . . .	21–23	..	7 3 6
100,000	10	Sept. 26	10	Cape Town & Dis., Ltd.	14½–15½	..	6 9 0
50,000	50	Nov. 3	6	Do. 6 p.c. 1st Mort.	53–55	..	5 9 1
550,000	Stk.	Oct. 15	12½	Commercial Old Stock	260–265		4 14 4
251,875	,,	,,	6½	Do. New do. .	200–205	..	4 12 8
271,875	,,	June 12	4⅜	Do. 4½ p.c. Deb.	130–134	..	3 7 2
800,000	Stk.	May 28	8½	Continental Union, Ltd.	138–143	.	5 11 11
200,000	,,	,,	7	Do. 7 p.c. Pref.	142–146	..	4 15 11
575,000	Stk.	Aug. 28	15⅝	Crystal Palace Ord. 5 p.c.	117–122	–1	4 7 4
60,000	,,	,,	5	Do. 5 p.c. Pref. .	120–125	..	4 0 0
106,158	,,	July 11	5	Do. 5 p.c. Deb. Stk.	139–142	..	3 10 5
486,090	10	July 30	10½	European, Ltd. . . .	17½–18½	..	5 13 6
354,060	10	,,	10½	Do. £7 10s. paid	13–14	..	5 12 6
15,243,200	Stk.	Aug. 14	4	Gas-light and Coke { 4 p.c. Ord. . .	84–85	–3	4 13 0
2,600,000	,,	,,	3⅛	{ 3⅛ p.c. max. .	87–89	–1	3 18 8
3,799,735	,,	,,	4	{ 4 p.c. Con. Pref.	109–111	–1	3 12 1
4,193,975	,,	June 12	3	{ 3 p.c. Con. Deb.	91–93	..	3 4 6
70,000	10	Oct 30	8	Hongkong & China, Ltd.	14½–15½	..	5 3 3
3,800,000	Stk.	Nov. 13	10	Imperial Continental .	201–204	+1	4 18 0
473,600	Stk.	Aug. 14	3½	Do. 3½ p.c. Deb. Red.	99–101	..	3 9 4
561,000	Stk.	Aug. 28	10	Liverpool United A	223–225	–½	4 8 11
718,100	,,	,,	7	Do. do. B .	165–167	..	4 3 10
306,083	,,	June 24	4	Do. do. Deb. Stk.	116–118	..	3 7 10
75,000	5	June 12	5	Malta & Medn., Ltd. .	4–4½	–¼	5 11 1
560,000	100	Oct. 1	5	Met. of { 5 p.c. Deb.	104–108	..	4 12 7
250,000	100	,,	4½	Melbourne { 4½ p.c. Deb.	102–104	..	4 6 7
541,920	20	Nov. 13	5½	Monte Video, Ltd. . .	9–10	..	7 0 0
1,515,892	Stk.	Aug. 8	4½	Newc'tle & G'tesh'd Con.	104–105	..	4 5 9
346,855	Stk.	July 4	3½	Do. 3½ p.c. Deb.	99–100	..	3 10 0
300,000	Stk.	Nov. 27	8	Oriental, Ltd. . . .	140–145*	..	5 10 4
60,000	5	Sept. 26	7	Ottoman, Ltd. . . .	6⅛–7	..	5 0 0
					* Ex div.		

Issue.	Share.	When ex-Dividend.	Dividend or Dividend & Bonus.	NAME	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p.c.	GAS COMPANIES.			£ s. d.
851,070	10	Oct. 15	7	River Plate Ord. . .	10–10½	..	6 13 4
300,000	Stk.	June 24	4	Do. 4 p.c. Deb..	92–94	..	4 5 1
250,000	10	Sept. 26	8	San Paulo, Ltd.. . .	11⅛–12½	..	6 8 0
135,000	Stk.	Sept. 11	10	Sheffield A	236–238	..	4 4 0
209,984	,,	,,	10	Do. B	235–237	..	4 4 5
523,498	,,	,,	10	Do. C	233–235	..	4 5 1
6,000,000	Stk.	Aug. 14	5⅜	South Met., 4 p.c. Ord.	117–120	–3	4 8 10
1,700,000	,,	July 11	3	Do. 3 p.c. Deb. . .	91–93	..	3 4 6
380,940	Stk.	Nov. 13	5	Southampton Ord. . .	103–107	..	4 13 6
87,950	,,	July 11	4	Do. 4 p.c. Deb.	102–105	..	3 16 2
120,000	Stk.	Aug. 28	6	Tottenham and Edmonton { A. 5 p.c.	118–123	..	4 17 7
300,520	,,	,,	4½	{ B. 3½ p.c.	93–96	..	4 13 9
182,380	10	Jan. 16	5	Tuscan, Ltd.. . . .	7–8	..	6 5 0
149,900	10	July 1	5	Do. 5 p.c. Deb. Red.	96–98	..	5 2 0
230,000	5	Aug. 14	9½	West Ham, 10 p.c. . .	10–11	..	4 6 4
172,000	10	,,	6½	Do. 7 p.c. . .	13½–14½	..	4 9 8
				WATER COMPANIES.			
780,599	Stk.	June 24	11⅝	Chelsea, Ord. . .	310–320	..	3 11 11
150,000	,,	,,	5	Do. 5 p.c. Pret. .	152–157	..	3 3 8
160,000	,,	,,	4½	Do. 4½ p.c. Pref. '75	140–143	..	3 2 11
175,785	,,	Sept. 26	4½	Do. 4½ p.c. Deb. .	137–142	..	3 3 5
1,720,560	Stk.	Oct. 15	8	East London, Ord.. .	216–220	+2	3 12 9
654,740	,,	June 12	4½	Do. 4½ p.c. Deb. .	142–147	..	3 1 3
1,282,943	,,	,,	3	Do. 3 p.c. Deb. .	97–99	..	3 0 7
700,000	50		8	Grand Junction { 10 p.c. max..	110–115	..	3 9 7
310,000	Stk.	Sept. 26	4	{ 4 p.c. Deb..	125–130	..	3 1 7
708,000	Stk.	Aug. 14	14	Kent	290–300	..	4 13 4
160,000	,,	,,	7	Do. New, 7 p.c. max..	195–205	..	3 8 4
1,043,800	100	June 24	11	Lambeth, 10 p.c. max..	298–303	..	3 12 7
406,200	100	,,	8½	Do. 7½ p.c. max..	215–225	..	3 15 7
350,000	Stk.	Sept. 26	4	Do. 4 p.c. Deb..	125–130	..	3 1 7
500,000	100	Aug. 14	12⅝	New River, New Shares	385–395	.	3 4 9
1,000,000	Stk.	July 30	4	Do. 4 p.c. Deb..	125–130	..	3 1 7
902,300	Stk.	June 12	7	South-wark and { Ord. . . .	195–200	..	3 10 0
126 500	100	,,	7	{ 7½ p.c. max.	180–185	..	3 15 8
489,200	Stk.	,,	5	{ 5 p.c. Pref.	153–156	..	3 4 1
1,019,585	,,	Oct. 15	4	Vauxhall { 4 p.c. A Deb.	123–128	..	3 2 6
1,155,066	Stk.	June 12	10	West Middlesex. . .	280–290	..	3 9 0
200,000	,,	,,	4½	Do. 4½ p.c. Deb. .	139–144	..	3 2 6
200,000	,,	Sept. 11	3	Do. 3 p.c. Deb. .	95–97	..	3 1 10
					* Ex div.		

† Next dividend will be at this rate.

Parliament in connection with the Government Water Bill. The number of new supplies connected in the past half year had only been six more as compared with the number connected in the corresponding period of the previous year; but the revenue estimated to be yielded by the new supplies was slightly less. This circumstance would, however, not surprise anyone who knew the Company's district, in which small houses had a constant tendency to increase. The quantity of water supplied in the half year had been well maintained; and reference could be made with equal confidence to the quality. The Secretary had placed in his hands a very interesting statement showing the progress of the Company's business from 1892 to 1897—a period of six years, during which the number of houses laid on was, roughly, 22,000, and the gross income advanced by £50,000. The capital expenditure showed, unfortunately, a considerable increase; but some costly works had had to be carried out in order to enable the Company to deal with the constantly increasing demand for supplies. These works were now approaching completion; and the Directors hoped and believed that the capital expenditure in future would be limited mainly, if not entirely, to extensions of pipes. For the first time they gave what might be described as a supplementary capital account in connection with intercommunication works. The only portion of these works which the Company were required to execute was a main to connect their works at Brixton with those of the Southwark and Vauxhall Company at Battersea. This main was practically completed; and to defray its cost, the proprietors would be asked at the special meeting to be held that day to sanction the raising of £22,000 by the creation and issue of debenture stock. Turning to the revenue account, he stated that the progress which had been made might be considered satisfactory on the whole. The income showed an increase as compared with that of the corresponding period of 1901, of £2764; and but for the two exceptional items he had mentioned, there would have been a decrease in the expenditure of £1134. He had referred to the wet summer. An additional income of £4658 was derived from new supplies at fixed rates, and new meter supplies had yielded an income of £390—making, together, an increase of rather more than £5000 for the half year. But against this had to be set a diminution of £1311 in the income derived from meter supplies, and of £971 in that derived from road watering. The increase in the income was therefore less than it was a year ago; but the business was likely to make an upward move again under more favourable climatic conditions. The variations in expenditure were given in fairly full detail in the report. Passing to the dividend and interest account, he stated that the amount available for distribution was nearly £3000 less than it was a year ago; but this was entirely accounted for by the cost of opposing the London Water Bill—a proceeding which had resulted in important amendments being made. The additional debenture stock issued early in the year had also involved an extra burden on the Company for interest of £1500. The Directors thought that the exceptional expenditure chargeable to revenue in the half year in connection with the reconstruction of the engines and boilers at Molesey, and expenses of opposing—or, rather, amending—the London Water Bill, might very fairly be charged to the contingency fund; and they therefore proposed that £4288 should be transferred from that fund to dividend and interest account. The transfer of this sum, the payment of a dividend at the rates recommended, and providing for the statutory payment to the City Chamberlain in respect of the sinking fund, would allow of a balance of about £5350 to be carried forward to the credit of the current half year. The Engineer's report he need not comment on. The system of constant supply had been steadily extending. There was a paragraph in the report with reference to the Government Water Bill; but it was discussed at their last meeting, and he did not know that there was much to add to what he then said. Of course, the constitution of the Board which was to be appointed was not a matter that really concerned the stockholders except in so far as it affected the course of the arbitration; but, speaking as a consumer and a ratepayer in London, he must express the hope that, even at the last moment, the Government would see fit to avoid establishing such a cumbrous, unwieldly, and inexperienced Board as that proposed in the Bill. It had been said that the great advantage to be derived from the transfer of the undertakings to a public Board would be unity of management. But it would be impossible ever to obtain unity of management with a Board such as was proposed by the Government. They proposed to give representation to every single borough in the Metropolitan area. Speaking quite generally, north and west London were supplied at a less charge than east and south London; and it would therefore follow that the representatives of Westminster (say), instead of being in favour of unity of management, would do their best to oppose in every possible way they could any proposal to alter the incidence of charge, or any effort to secure the equalizing of rates. Passing from that point, however, and coming to the question of the Bill as it affected their Company, it was not a measure such as they might have expected, having regard to the exhaustive inquiry that was held and to the unanimous report of the Royal Commission appointed by the Government themselves. Nevertheless, he must say that he thought it would be better, on the whole, for the interests of the stockholders, that the Bill should be passed in the present session with such amendments as they might get introduced. It was quite certain that they could not go on as they were. There was a constant agitation against the Companies, which involved them in enormous expense. They had certain statutory duties to perform; but whenever they went to Parliament for powers to enable them to discharge these duties, they were met with more and more onerous conditions, and the Directors and the officials had their time and energies diverted from their proper business in order to defend the interests of their Companies. An examination of the accounts from year to year would show what the cost of this opposition had been. Taking all these matters into consideration, he thought that the stockholders would agree with him that, upon the whole, it would be better to have the question settled once for all. Fortunately, a statement had been made in Parliament, by the President of the Local Government



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WARRINGTON,

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&c.,

&c.

Board, that it was the intention of the Government to give them the benefit of the Lands Clauses Acts. This was very important; and the Directors would press it on the attention of the Arbitrators. He afterwards referred to the debenture stock which the proprietors would be asked at the special meeting for authority to raise.

Mr. WILLIAM J. FRASER seconded the motion, which was carried unanimously.

The CHAIRMAN afterwards proposed a resolution transferring £4288 in respect of exceptional expenditure during the half year from the contingency fund, and approving the payment of dividends for the half year ended Sept. 30 last at the prescribed rates on the £1,043,800 of consolidated 10 per cent. stock, and on the £406,200 of consolidated 7½ per cent. stock, together with a payment, at the rate of 1 per cent. per annum, on all the consolidated stock of the Company, on account of deficiencies of previous dividends.

Mr. JOHN BOUSTEAD seconded the motion, which was carried unanimously.

An Extraordinary General Meeting was held subsequently, when the resolutions set out in the notice convening it were passed, authorizing the Directors:

(1)—To create and issue the whole or part of the £750,000 redeemable debenture stock authorized by the Lambeth Water-Works Act, 1900, bearing interest at such uniform rate as, in the opinion of the Governor for the time being of the Bank of England or of some person to be nominated by him, shall be best calculated to secure the issue of such stock at par, in such sums, at such times, and in such manner as the Directors, subject to the provisions of that Act, may see fit.

(2)—To create such amount of redeemable debenture stock as will produce £22,000, pursuant to the Metropolis Water Act, 1899, and to issue the same bearing interest at the rate of three pounds per centum per annum, in such sums, at such times, and in such manner as the Directors, subject to the provisions of that Act, may see fit.

The proceedings terminated with a vote of thanks to the Chairman and Directors.

CHELMSFORD WATER SUPPLY.

The New Scheme.

A Special Meeting of the Chelmsford Town Council was held a few days ago to consider the plans, estimates, &c., of Mr. Percy Griffith, M.Inst.C.E., the adviser of the Corporation in respect of their water-works, for permanent plant in connection with the new tube well. The MAYOR (Alderman G. W. Taylor) presided.

Mr. GRIFFITH, in explaining the general outline of the scheme, said it was his intention to utilize a borehole pump; and the depth at which it was to be fixed was somewhat great—350 feet. This had been arranged with a view to two leading circumstances—viz., the depth at which the quantity of water required would be found, and practical engineering considerations as to repairs and maintenance. The boilers would be provided in duplicate. A similar pump which he designed at Gainsborough had worked for two years without needing a penny to be spent in repairs.

Alderman WHITMORE proposed that plans, specifications, &c., should be sent to the Local Government Board, together with an application for sanction to borrow £9400 to carry out the scheme.

Alderman BOND seconded the motion.

Mr. OSBORN asked Mr. Griffith to explain how it was that only 6000 gallons of water per hour were obtained from the new bore by the air compressor during the recent 36 hours' test; how it was that they got more water on Monday than on any other day of the week; and what grounds he had for saying that they would get 15,000 gallons an hour. He contended that the result of the test did not justify them in going in for the new scheme.

Alderman CHANCELLOR thought the Council ought to consider whether they were taking the right step in agreeing to the proposition. He gave a history of the water difficulties in the town, and pointed out that in 1898 Mr. Francis, the Engineer of the New River Company, advised them not to make any boring on the site of the old well. Up till quite recently, the new bore was treated as a temporary measure; but in Mr. Griffith's report it was suddenly elevated into the position of a permanent supply. With the new reservoir, the scheme would cost nearly £20,000, and even when it was carried out their daily supply would be only 260,000 gallons, or 100,000 gallons less than the amount they required. The least they ought to have for a town like Chelmsford was 500,000 gallons per day. Looking at all the facts, he had come to the conclusion that to carry out the scheme would be a waste of the ratepayers' money, and that a scheme on the lines suggested by Mr. Francis offered the greatest prospect of success.

The MAYOR pointed out that the Council had met to consider Mr. Griffith's plans and estimates; but he did not intend to allow a general discussion on every question raised.

Mr. MASKELL asked if Mr. Griffith could demonstrate to them that 15,000 gallons per hour could be taken from a well the records of which showed only 7000 gallons.

Mr. COWELL asked whether they could not utilize the old machinery for the new bore, instead of spending £10,000 on new plant. In the event of the new bore being deepened, would the engine proposed be powerful enough to lift the water from a lower level?

The SURVEYOR said they were now pumping from the old well nearly 24 hours per day, and the yield was 77,728 gallons.

Mr. GRIFFITH, in replying, said the recent 36 hours' test was not a test of the boring, but of the air-lifting plant. The result revealed the conditions of the working of that plant, but did not give indications as to what the bore would do. The reason the air-lifting plant did not deliver so much on other days as on Mondays was because it required a certain head underneath it to enable it to work. As to the cost, the

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figures were already before the Council, and he anticipated that £9400 would complete everything in his hands. He was perfectly willing to take upon himself the entire responsibility of making the scheme a permanent one. As to the question whether the pump would lift from a lower level, he said that in providing for it to be placed at a depth of 350 feet he had allowed ample scope for all they could get from the boring; and it would not be necessary to lower it for many years. As to the main question of the yield of the boring, the majority of the Committee were satisfied that they would obtain the quantity of water he had suggested. With regard to his estimate that the boring might yield 15,000 gallons per hour, he said the results of tests on three occasions had been such as to make him confident in asserting that the minimum supply to be obtained from the boring would be that quantity. He concluded by assuring the Council with the utmost confidence that the boring would yield at least 15,000 gallons per hour under the conditions he had stated.

Dr. THRESH, the Medical Officer of Health for Essex, who was in attendance by invitation of the Sewer and Water Supply Committee, said the scheme suggested had his approval. Mr. Griffith had produced figures and diagrams which were absolute proofs, to engineers or anyone interested in deep wells, that they would get 15,000 gallons of water per hour. It was very doubtful whether, by having a big well and adits, they would obtain more water. There was no such well in Essex, and the only one tried outside it proved a failure.

Mr. GRAY suggested that it would be much fairer to put down temporary plant until they reached 15,000 gallons an hour; and he would prefer to pay twice as much for the temporary pumping rather than saddle the future burgesses with a burden for which they might get no benefit at all.

The MAYOR pointed out that the scheme did not originate with Mr. Griffith, who had no object in backing it up, except so far as his own reputation as an honourable man was concerned. In addition, they had the approval of Dr. Thresh; and if the Council carried the resolution, the Local Government Board would send down an Inspector to hold an inquiry, at which anyone having anything to advance against the scheme would have an opportunity of doing so.

Mr. LAWN said he came to the meeting with the firm intention of voting against the resolution; but, after hearing Mr. Griffith and Dr. Thresh, he should vote for it.

Alderman WHITMORE said, as Chairman of the Committee, he had no reason to be dissatisfied with the course the discussion had taken. He impressed upon the Council the serious condition the town was in owing to the small quantity of water they were getting. If they had to go through another dry summer with the present supply, there would be a water famine. With regard to Mr. Gray's suggestion, the cost of temporary plant was prohibitive.

Mr. GRIFFITH said it was practically impossible to put down temporary plant to raise all the water they hoped to get from their permanent supply.

The resolution was then put, and carried by 13 votes to 5.

NOTES FROM SCOTLAND.

From Our Own Correspondent.

Saturday.

I suppose it will occasion little surprise to learn that in their settling down in the new gas-works at Granton the Edinburgh and Leith Gas Commissioners are finding some trouble with the men in the Leith works. These are now closed; and the men who were employed in them have not all, of course, been taken to Granton. There is, first in order, the statement repeated that foreign workmen are being employed in the new works. As to this, Mr. Herring, a month ago, said there might be foreign workmen among the men employed by the Contractors; but he was aware of none upon the works staff. There is little doubt, I suppose, but that, if some of the Contractors have undertaken the upkeep for a certain time of the plant they have supplied, they will send men to work the plant whom they know to be familiar with it; and some of these may be of foreign origin, The statement was made at a workmen's meeting outside; but it was also put forward at a meeting of the Gas Commissioners last Monday. Mr. W. F. Stewart, of Leith, said there was considerable dissatisfaction in Leith on account of the foreign labour which it was said was being employed at Granton. Referring to this statement, Sir Andrew M'Donald said the employment of foreign labour was a popular phrase just now; but there were foreigners who could do work that we were not able to do, and while this was so, our workmen would have to take a back seat. All things being equal, he should prefer our own men; but they must look at everything fairly and openly, and not do anything which would curb Mr. Herring in his management of those great works. This was a very wise remark; but it will be observed that Sir Andrew M'Donald practically admits that foreign workmen are being employed. The matter is, however, purely one of administration; and the Commissioners should have almost no say in it.

But the Commissioners have a duty to Leith. On account of their policy, workmen should not be displaced wholesale; and this duty they are attending to. The minutes of the Works Committee, which were adopted by the Commissioners, stated that, inquiries having been made of the Engineer as to how the Leith works employees were to be dealt with now that the works had been closed, he reported that he had given notice to all employees under sixty years of age that their services would not be longer required; but that he had already engaged, or was still to engage, as many of those men as he found suitable for the Granton works. At his request, the Committee appointed a Sub-Committee to consider and report as to what allowances in the way of pensions could be granted to the men above sixty years of age whose services could not be further required. At the meeting of the Commissioners, Provost Mackie, of Leith, said on his return from London he found a petition on his desk by over fifty men who were employed in the Leith works, complaining of the treatment they were receiving in not being taken to Granton, which they considered

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a great hardship; and they submitted that, on account of their long service, they should have the preference. Sir Andrew M'Donald said he thought the petition should have come to them through their officials; but they were prepared to treat the workmen justly at this time of transition. They would have to face a kind of pension, or whatever else they might call it, to some of the men who were physically or otherwise unfit for the kind of mechanical work that was now in vogue. But he was just a little afraid that the matter was being canvassed in Leith, and that this would do the employees more harm than good. The subject was sent to the same Committee as the Works Committee had appointed. The Granton Works Sub-Committee reported that the opening ceremony of the Granton works should take place about the middle of December.

Mr. D. Purves was re-appointed Convener of the Works Committee; and Provost Mackie was chosen Convener of the Finance and Law Committee, in room of Mr. Manclark, who is not now a member of the Commission.

A special meeting of the Dumfries Town Council was held on Monday, to receive the report of the Gas Committee with respect to the loan for the erection of a new gasholder, station meter, and tar and liquor tank. The report was that the Dumfries Savings Bank had offered to lend £12,000 at the rate of 3½ per cent., the principal to be repaid in half-yearly instalments spread over thirty years. The Committee were of opinion that it was not necessary to borrow more in the meantime than the sum required for the new gasholder; and they recommended that they should take only £8000 of the amount offered. This was agreed to.

There is much indignation in Falkirk at the resolution of the Town Council not to proceed with the erection of new gas-works upon the Thornhill site, to which I referred at length in my "Notes" last week. The conduct of the Council is condemned by the Editor of the "Falkirk Herald" in to-day's issue, in no unmeasured way; and it is also condemned in a letter by a former town councillor. There are given, further, in the news columns, the views of a number of manufacturers who were interviewed upon the subject by a representative of the newspaper. The Editor looks upon the resolution as being one which will likely lead the Corporation into conflict with consumers, at whose instance the Corporation may be prosecuted before the Sheriff for failing to give a sufficient supply of gas. He even hints that a threat to this effect is under consideration by some consumers who are outside the burgh boundary. Consumers inside the burgh might have compunction in exacting penalties, a portion of which would come out of their own pockets; but no such consideration would weigh with those outside. Indeed, one of the manufacturers who were interviewed stated that he will be under the necessity of recovering penalties in order to recoup himself for the loss he sustains through not having sufficient gas for his business purposes. One ironfounder remarked that in his works they were only receiving 6-10ths pressure. Another said that, owing to the insufficiency of the light, his men were able to do only half of the work they might otherwise perform, which was a heavy loss to them. In the moulding-shop, the men had practically to cease work when the gas required to be lighted. The owner of a laundry stated that during the day he got a sufficient supply of gas. In the morning the pressure was very imperfect; and in the evening, the state of matters was almost unbearable—extensive machinery for laundry purposes being practically useless. I suppose these instances could be multiplied many times. There is general discontent at the turn affairs have taken. The pity is that no one suggests a way out of the difficulty. Whether the decision is irrevocable or not is not even made apparent. I suspect it is, and that Thornhill must be held to be abandoned. What, then, should follow is the preparation of another scheme. The first necessity is a man of sufficient ability to convince his fellow-citizens that the works may be transported without entailing financial burdens on the community. If this could be done, there need be no fear of the work proceeding, as no one has an academic opposition to new works.

The Airdrie Town Council had again before them this week the proposal to acquire the undertaking of the Airdrie Gas Company. It was stated that the Company intend making considerable additions to their works, and that this was an opportune time to negotiate for the purchase of the undertaking. The Company, it appears, are agreeable to treat. A Committee of the Corporation were appointed to reopen negotiations with the Company; and the subject was adjourned till January.

The Gas Committee of the Dundee Town Council have resolved to vote Mr. S. Donald, who was interim Gas Manager, an honorarium of 100 guineas for his services.

At a meeting of the Gas and Electricity Committee of the Aberdeen Town Council on Wednesday, Mr. Kemp, who has been reappointed Convener, referred to the illness of Mr. A. Smith, the Manager of the gas and electricity undertakings. I am sorry to say Mr. Smith has been in indifferent health for a long time.

A few years ago, it will be remembered, there was some consternation among pipe manufacturers in this country at the inroads of American manufacturers. A few orders were secured here, but little has been heard of them. It was evident that the trade was not a prosperous one; but I question whether what transpired in the Glasgow Town Council last week was suspected. The Sub-Committee on Works of the Water Department recommended the acceptance of a tender by the Staveley Coal and Iron Company, Limited, to supply 2000 tons of cast-iron pipes for a new water-main, at the price of £12,255. Attention was called to the fact that, in the specification which was issued, there was a clause to the effect that, in the event of the contract being let to a firm outside Great Britain, the contractors should have the pipes tested in Glasgow at their own expense. The explanation given was that the clause was inserted because of the unsatisfactory way in which a contract for 36-inch pipes was fulfilled by an American firm. So many of the pipes in that contract were found to be faulty, that the loss was very large indeed. It turns out, therefore, that the imported pipes, if they were cheap, were not at all good. It is a tribute to the

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BLACKBURN	1,250,000	YORK	750,000
WINDSOR ST. WORKS, BIRMINGHAM	2,000,000	ROCHESTER	500,000
SALTLEY WORKS, BIRMINGHAM	2,000,000	KINGSTON, ONT.	300,000
COLCHESTER	300,000	CRYSTAL PALACE DISTRICT	2,000,000
BIRKENHEAD.	2,250,000	DULUTH, MINN.	300,000
SWINDON (New Swindon Gas Co.)	120,000	CATERHAM	150,000
SALTLEY, BIRMINGHAM (Second Contract)	2,000,000	LEICESTER	2,000,000
WINDSOR ST., BIRMINGHAM (Second Contract)	2,000,000	ENSCHEDE (HOLLAND)	150,000
HALIFAX	1,000,000	BUENOS AYRES (RIVER PLATE CO.)	700,000
TORONTO	250,000	BURNLEY	1,500,000
OTTAWA	250,000	KINGSTON-ON-THAMES	1,750,000
LINDSAY (Remodelled)	125,000	ACCRINGTON	500,000
MONTREAL	500,000	TONBRIDGE	300,000
TORONTO (Second Contract Remodelled)	2,000,000	STRETFORD	500,000
BELLEVILLE	250,000	OLDBURY	300,000
OTTAWA (Second Contract)	250,000	TODMORDEN	500,000
BRANTFORD (Remodelled)	200,000	SALTLEY, BIRMINGHAM (Third Contract)	2,000,000
ST. CATHERINES (Remodelled)	250,000	YORK (Second Contract)	750,000
KINGSTON, PA.	125,000	ROCHESTER (Second Contract)	500,000
PETERBOROUGH, ONT.	250,000	NEWPORT (MON.)	250,000
WILKESBARRE, PA.	750,000	TOKIO, JAPAN	1,000,000
ST. CATHERINES (Second Contract)	250,000	PERNAMBUCO (Brazil)	125,000
BUFFALO, N.Y.	2,000,000	MALTON	150,000
WINNIPEG, MAN.	500,000	DULUTH, MINN. (Second Contract)	300,000
COLCHESTER (Second Contract)	300,000	BROCKVILLE (ONT.)	250,000

Complete Gas-Works at NELSON, BRITISH COLUMBIA.

LEEDS, 1,800,000 Cub. Ft. SMETHWICK, 500,000 Cub. Ft. LEICESTER (2nd Cont.), 1,000,000 Cub. Ft.
GRAVESEND, 300,000 C. Ft. NEWPORT, MON. (2nd Cont.), 250,000 C. Ft. TORONTO (3rd Cont.), 750,000 C. Ft.

honesty of our manufacturers at home that their work can be accepted without special provisions as to testing being imposed.

A peculiar bequest has been made by an Aberdeen citizen, who has directed the residue of his estate, amounting to nearly £14,000, to be employed by his Trustees in carrying out his wish that the city of Aberdeen should be provided with a water supply from a suitable source in the valley of the Dee above the Linn of Dee, in accordance with the scheme of the late Sir Alex. Anderson, at one time Lord Provost of Aberdeen. The Trustees are holding the money, but are doing nothing. The bequest is an absurdity, and will likely fall under the Thelusson Act, which forbids trust funds to be accumulated for more than 20 or 21 years. When that time arrives, if the money has not been applied as directed—and it is not likely to be—the bequest will lapse.

CURRENT SALES OF GAS PRODUCTS.

LIVERPOOL, *Nov.* 29.

Sulphate of Ammonia.

There being further requirements for the purpose of covering November contracts, there has been good demand for immediate inquiry; and although at the close the market has assumed a quieter tone, the quotations are £11 10s. per ton f.o.b. Hull, and £11 12s. 6d. per ton f.o.b. Liverpool and Leith. For December delivery, makers seek an advance; but, on the other hand, consumers abroad seem determined to wait for some decline. For January-June delivery, £11 15s. per ton f.o.b. Leith, ordinary terms, has been paid, and makers now quote £11 17s. 6d. per ton. London, Beckton terms, is quoted £11 12s. 6d. per ton for December delivery, and £11 17s. 6d. per ton for delivery over the spring months.

Nitrate of Soda.

This article on spot is steady at 8s. 10½d. to 9s. per cwt., according to quality. In the forward position, there is rather more interest, but no improvement in values.

LONDON, *Nov.* 29.

Tar Products.

The markets generally remain in the same position. The demand for pitch continues very good, especially for prompt delivery; but as nearly all the makers are fully sold to the end of the year, it is difficult to ascertain the exact value. There are more inquiries in the market for delivery all over 1904; but these appear to be of a speculative nature. In anthracene, there is nothing fresh to report; the position remaining unchanged. There is rather a better demand for toluol; and business is reported at 7½d. for prompt delivery, and at 8d. for January-June. Crude carbolic is decidedly quiet. Business has again been done at 1s. 8d. for December shipment; but consumers do not care to pay this price for January-June. There is evidently more offering at present; while trade in crystals is quiet. Small sales of 39-40's are reported at 5¼d.; but consumers will not pay 5d. for 34-35's. Benzol is decidedly better. Business is reported in 50-90 per cent. at 8¾d., December-March in the North of England; while 9d. was declined for 90 per cent. by London refiners for January-June shipment. In creosote, there is nothing fresh to report. London makers are very firm in their ideas, evidently being well sold; but in the provinces there is more offering.

The average values during the week were: Tar, 20s. 6d. to 25s. 6d. Pitch, London, 56s. to 57s. 6d.; east coast, 53s. 6d. to 55s.; west coast, 52s. to 53s. Benzol, 90 per cent., 8½d. to 9d.; 50-90 per cent., 8d. to 8¼d. Toluol, 7½d. to 8d. Crude naphtha, 3d. to 3¼d.; solvent naphtha, 8½d. to 9½d.; heavy naphtha, 9d. to 10d. Creosote, London, 1⅞d.; North, 1⅜d. to 1½d. Heavy oils, 2d. to 2¼d. Carbolic acid, 60 per cent., 1s. 8d. Naphthalene, 40s. to 55s.; salts, 23s. 6d. to 26s. 6d. Anthracene, "A" quality, 1½d. to 1¾d.; "B" quality, 1d. nominal.

Sulphate of Ammonia.

The market closes decidedly firmer, with a good inquiry for both prompt and forward delivery. The Gaslight and Coke Company are not now sellers for December only; while they quote £11 17s. 6d. for January-April, and have declined £11 15s. over this period. Another London Gas Company have sold freely at £11 12s. 6d. for December shipment, and are now out of the market for the present year. Business has been done in Hull at £11 11s. 3d. for December shipment; and makers decline to quote for forward delivery. In Leith, £11 12s. 6d. has been paid for prompt shipment; and there is a strong inquiry for forward delivery. In Liverpool, business is reported at prices varying from £11 10s. to £11 12s. 6d.; but there is really very little offering at this port. The general tone of the market is decidedly firmer; and it appears as if still higher prices will rule.

COAL TRADE REPORTS.

Lancashire Coal Trade.

If anything, there is perhaps some slight improvement in the coal trade of this district. House-fire qualities are again moving away rather more freely; and although pits are not working altogether full time, there is comparatively very little accumulating in stock, except under load on the pit sidings. Common round coals remain only in moderate request for steam and forge purposes; but with an absence of any surplus of moment on the market, prices are being well maintained at about 8s. 3d. and 8s. 6d. for ordinary descriptions, to 9s. for the best qualities. Engine fuel continues plentiful—chiefly, however, in the commoner sorts; and prices are still being cut very low to effect clearances. But if anything there is a steadying tone in the market, and not

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quite so much of the very low cutting. Best qualities of Lancashire slack are firm at about 6s. 6d. to 7s. per ton at the pit, medium sorts 5s. 6d. to 6s., with common slack ranging from 4s. 3d. to 4s. 9d., according to quality. The shipping trade remains but indifferent, with 10s. to 10s. 6d. about average figures for steam coals delivered at the ports on the Mersey. All descriptions of Lancashire coke are firm at recent full rates; but in the Yorkshire district, furnace qualities are becoming more plentiful, with prices easier to the extent of 1s. to 1s. 6d. per ton on recent full quotations. With regard to the wages question, which is now to be decided by Lord James, the Arbitrator, at a meeting of the Conciliation Board convened for the 9th inst., the anticipation generally is that for the present at least wages rates may remain unaltered, although the Arbitrator may possibly acknowledge that the coalowners have some justification in asking for a reduction. With the winter season commenced, however, there might be reason for holding any change in abeyance.

Northern Coal Trade.

The coal trade is active, and there is still some demand from the United States; so that the collieries are kept briskly at work. The request for steam coals, for this reason, is above that usual at this time of the year, so that the collieries in the North are active, as well as those in the district to the south which is usually briskest in winter. Best Northumbrian steam coals are 11s. 3d. to 11s. 6d. per ton f.o.b.; and the pits are kept fully at work. Second-class steams are 10s. to 10s. 9d., and steam smalls are steady at 5s. 6d. to 6s. In the gas coal trade, there is a very strong inquiry, and deliveries are at about the heaviest point in the year. The contract quantities take so much of the best coals, that for any small surplus the collieries can ask very high prices; and thus Durham gas coals vary from 9s. 3d. to 10s. per ton f.o.b., according to quality. There are very few contracts in course of negotiation at present. Gas coke is rather irregular; the production being heavy. The price varies from 12s. 6d. to 14s. per ton f.o.b.

Scotch Coal Trade.

There is an alarmist outcry prevalent, to the effect that the iron industry is about to enter upon a spell of depression, in which event coal will soon be plentiful and cheap. Were it not for this, there is nothing apparent to disturb the normal condition of trade, which is fully active. Last week, Sheriff Jameson, the Arbitrator, gave his decision upon the demand of the miners for an advance in wages of 6d. per day. He finds them entitled to an advance of 3d. per day. The prices quoted are: Main, 8s. 6d. to 8s. 9d. per ton f.o.b. Glasgow, ell 10s. 3d. to 11s. 3d., and splint 10s. 6d. to 11s. The shipments for the week amounted to 245,403 tons—a decrease of 12,108 tons upon the preceding week, but an increase of 38,488 tons upon the corresponding week of last year. For the year to date, the total shipments have been 9,953,400 tons—an increase of 1,028,880 tons upon the same period of last year.

Suffocated by Gas.—Last Tuesday afternoon a report was received at the Rathmines Police Station that a Mrs. Eliza Gibbons, aged 84, had died at her lodgings, in the Rathgar Road, from the effect of an escape of gas. It appears that she retired on the previous evening shortly before eight o'clock, and at twelve o'clock on Tuesday the landlady was alarmed at hearing heavy breathing from the room, the door of which was locked. A doctor was summoned, who, by breaking a panel, effected an entrance, and found Mrs. Gibbons in an unconscious state. There was a strong smell of gas, and examination disclosed that the jet had not been properly turned off. Every effort was made to restore consciousness, but unhappily without result.

Birmingham Gas Extensions.—At the monthly meeting of the Birmingham City Council to be held to-day (at which the report of the Gas Committee noticed in last week's "JOURNAL" is to be considered), Mr. Walthall will move—"That the information given by the Gas Committee in their report applying for power to borrow the sum of £200,000 is insufficient, and not in accordance with the suggestion made by the Finance Committee and approved by the Council, that details of any proposed expenditure on industrial undertakings should be given; and this Council is of opinion that, before further borrowing powers are applied for, the question of the development of electric supply rather than extension of the gas undertaking should be considered."

Gas Poisoning Caused by a Defective Gaselier.—A serious, though happily not fatal, case of gas poisoning occurred last week at the Lee Brigg Hotel, Altofts, near Normanton. It appears that after the landlord and his wife retired to rest on Tuesday night, a weight fell from the gaselier in their bedroom, allowing the bottom portion to slide down, and gas to escape into the room. On their son going to the room next morning, he found the door locked; and being unable to get any reply, he burst it open, and found his mother and father unconscious in bed—the latter having apparently been overcome during an attempt to rise. Medical aid was, however, promptly summoned, and steps were successfully taken to restore animation. The latest reports state that both sufferers are progressing favourably.

Gas Supply in Toronto.—The Consumers' Gas Company of Toronto have just held their 54th annual meeting. The Directors stated in their report that during the past year 2314 new services were put in, and, including the island, 11·45 miles of mains were laid; making a total of upwards of 268 miles. On the 30th of September last, there were in use 923 street-lamps and 30,812 meters; and the gas-rental amounted to $771,982, against $716,524 during 1900-1. The income of the Company totalled $843,634, made up as follows: Gas-rents $771,982; coke, $50,868; tar, $8455; ammoniacal liquor, $10,282; office and house rents, $1847. Of this, $175,000 was paid in dividends, $9672 in interest, and $153,246 charged to profit and loss. The expenditure was $509,800. The assets of the Company are valued at $3,320,919.

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Quality of Oldham Gas.—Reporting to the Oldham Gas Committee on a letter from the Chadderton Urban District Council calling attention to the bad quality of the gas supplied by the Corporation, the General Manager (Mr. A. Andrew) stated that previously there had been no complaint from any part of Chadderton; and he could not find that there was the least ground for it now. It would, he said, be much better if consumers who thought they had cause to be dissatisfied with either the quality or the pressure of the gas would communicate with the gas office direct, instead of complaining through the District Council, because the latter method of procedure caused delay in making inquiry. As a matter of fact, the quality of the gas had not deteriorated at all. Mr. Andrew was instructed to reply to the letter.

Aberavon New Gas-Works Scheme.—Mr. E. P. Burd, one of the Local Government Board Inspectors, held an inquiry at Aberavon last Thursday into the application of the Town Council for a Provisional Order to increase their borrowing powers. It was shown that the new gas-works scheme, when carried out, will exhaust the remaining balance of the £35,000 sanctioned by the Council's Act, and they seek to raise the total to £50,000; the extra £15,000 being required for completing the new scheme, for laying mains in the Port Talbot and Cwmavon districts, purchasing meters, &c. The Inspector also heard the application of the Council for permission to alter the constitution of the Gas Committee. He suggested that the section of the Act dealing with this matter should be repealed. In this event, the ordinary powers conferred by the Public Health Act would apply, and the Committee would then, if so desired, consist of the whole of the members of the Council. The Town Clerk (Mr. M. Tennant) said the Council would adopt any course which was suggested rather than that the old state of things should go on. No objection was raised.

Wolverhampton Gas Fatality: The Steam-Roller Again.—At the inquest held on the body of Edward Griffiths, who was asphyxiated by gas at Wolverhampton under circumstances briefly reported in last week's "JOURNAL," it was stated that the gas found its way into the house owing to a fracture of the main outside. This main was laid 2½ feet below the surface; but the Corporation steam-roller had been at work in the street during the week preceding the accident. A main-layer in the employ of the Gas Company gave it as his opinion that the main was broken by the roller passing over it; but he said the pipe would not have cracked if it had been properly packed. Mr. Plumptre, who appeared for the Company, explained that the main was put in many years ago, but there had been no complaint with regard to it until the present affair. Since the roller had been there, however, other cracks had been found in the main in the same street. He contended that there was no positive duty imposed on the Company to see that their mains were properly packed; but they must not be negligent. If they knew of the defect, and did not repair it, he should say off-hand that they would be liable. The Coroner, in summing-up, said the steam-roller was used every day, and the pipes must be able to stand the usual traffic. The Jury returned a verdict of "Accidental death," attaching no blame to anyone.

High-Pressure Gas Lighting.—Messrs. R. & A. Main write as follows on this subject: "The question raised by Mr. Fletcher, and dealt with in your issue for Nov. 25, by Mr. Onslow, of Woolwich, is one of great interest to the gas profession. We may state that in our new show-rooms, West Nile Street, Glasgow, the lighting is done by means of the Keith high-pressure system. The compressor is fixed on the consumer's side of the meter; and the ordinary supply at town pressure for cookers, fires, &c., is taken off before the gas enters the compressor. A special pipe is, of course, led to the high-pressure lamps. The arrangement is perfectly simple and inexpensive, and it gives splendid results. Judging from our experience here, we cannot see there should be any difficulty whatever in dealing with the question of high and low pressure systems."

Sales of Stocks and Shares.—At the Mart, Tokenhouse Yard, E.C., last Tuesday, Mr. Alfred Richards sold about £2000 of "A" ordinary stock of the Brighton and Hove Gas Company, the last dividend on which was at the rate of 7¾ per cent. per annum, at prices ranging from £158 5s. to £159 10s. per £100. On the same occasion, he offered, by order of the Directors, £5000 of ordinary "C" stock (last dividend 6 per cent.) and £2500 of 4 per cent. perpetual debenture stock of the Ilford Gas Company. The former fetched prices ranging from £112 15s. to £114, and the latter £102 12s. 6d. and £102 15s. per £100 of stock. At Otley, last Friday, Messrs. Dacre and Son offered by auction a new issue of £2500 of ordinary stock in the Otley Gas Company, ranking for a standard dividend of 5 per cent., subject to the sliding-scale. The stock, which is now carrying 5¾ per cent., was put up in lots of £100, and realized from £113 10s. to £116 each.

The Broadstairs Gas Company have placed with Messrs. Robert Dempster and Sons, Limited, of Elland, an order for coke elevating and breaking plant.

The consent of the Local Government Board to the creation of £250,000 of stock has been received by the Southport, Birkdale, and West Lancashire Joint Water Board.

The tender of Messrs. Goddard, Massey, and Warner, amounting to £1723, for new sulphate plant at Foleshill, was accepted by the Coventry City Council at their meeting last Tuesday.

Messrs. Bryan Donkin and Clench, Limited, advise that their headquarters will in future be at their Lincoln Works, Chesterfield—the entire removal of the works to Chesterfield having now been effected.

We have received Calvert's "Mechanics' Almanack and Workshop Companion" for 1903. This useful collection of tables and general information for artizans and handicraftsmen, and those engaged in mechanical, engineering, and building and constructive trades, has now reached its thirtieth year of publication, and therefore has an established reputation. The publisher is Mr. John Heywood, of Manchester and London.

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ASSISTANT-MANAGER. Barking Gas Company.
CLERK. Ilford Gas Company.
DRAUGHTSMAN. Gibbons Bros., Dudley.
DRAUGHTSMAN. No. 3951.
ENGINEER AND MANAGER FOR PERU. Lee & Nightingale, Liverpool.
GENERAL FOREMAN. No. 3954.
MAIN AND SERVICE LAYER. Redditch Gas-Works.
MANAGER FOR GAS-FITTINGS, &c., TRADE FOR NEW ZEALAND. Lang, London.
SHOW-ROOM ATTENDANT AND CLERK. Ilford Gas Company.
SLOT METER AND INCANDESCENT MANTLE ATTENDANT, &c. No. 3950.
SUPERINTENDENT FOR EXTENSION OF WORKS. Sevenoaks Water Company.
WASTE INSPECTOR. Sutton Water Company.

SITUATIONS WANTED.

REPRESENTATIVE OF GAS APPARATUS MANUFACTURERS. No. 3952.
TRAVELLER IN GAS STOVE TRADE. Howland, Faversham.

AGENT WANTED BY GERMAN MANUFACTURER. No. 3939.

MEETINGS OF COMPANIES.

CHELSEA WATER COMPANY. Dec. 18.
CONTINENTAL UNION GAS COMPANY. Dec. 9.
GRAND JUNCTION WATER COMPANY. Dec. 10.
HORNSEY GAS COMPANY. Dec. 19.

PLANT, &c. (Second-Hand), FOR SALE.

COMPLETE GAS-WORKS PLANT. Edinburgh and Leith Gas Department.
EXHAUSTER AND GASHOLDERS (various). Wright, London.
PURIFIERS, SCRUBBER-WASHERS, GASHOLDERS, &c. Firth Blakeley, Dewsbury.
RAILS, TURNTABLES, WAGGONS, &c. Beatson, Derby.
SCRUBBER, TAR EXTRACTOR, EXHAUSTER, BOILERS, HYDRAULIC MAIN, &c., &c., Ashford Gas Department. Tenders by Dec. 12.
STATION METER (5000 Feet per hour). Hexham Gas-Works.
TUBES AND FITTINGS. No. 3953.

PLANT, &c. (Second-Hand) WANTED.

PURIFIERS. Bangor Gas Department. Dec. 15.
TANK AND GASHOLDER. Wright, London.

SALES OF STOCKS AND SHARES.

GAS METER COMPANY. No. 3956.
GREAT YARMOUTH WATER COMPANY. Dec. 9.
NEWPORT (Mon) GAS COMPANY. Dec. 12.
PORTSMOUTH WATER COMPANY. Dec. 11.
SHREWSBURY GASLIGHT COMPANY (Loans on Mortgage).
SOUTH ESSEX WATER COMPANY. Dec. 9.
WALKER, C. & W. No. 3955.

TENDERS FOR

BRICKWORK FOR RETORT ARCHES AND CHIMNEYS.
BURY GAS DEPARTMENT. Tenders by Dec. 13.

COAL.
SOUTHWARK AND VAUXHALL WATER COMPANY. Tenders by Dec. 8.

COKE STORAGE HOPPERS.
BURY GAS DEPARTMENT. Tenders by Dec. 13.

CONDENSERS.
WALLASEY GAS DEPARTMENT. Tenders by Dec. 18.

ENGINE AND EXHAUSTER HOUSE.
TEIGNMOUTH GAS DEPARTMENT. Tenders by Jan. 6.

EXHAUSTERS, &c.
TEIGNMOUTH GAS DEPARTMENT. Tenders by Jan. 6.
WALLASEY GAS DEPARTMENT. Tenders by Dec. 18.

FIRE-BRICKS,
LEICESTER GAS DEPARTMENT. Tenders by Dec. 6.

GASHOLDER (Adding Lift to).
ABERTILLERY GAS DEPARTMENT. Tenders by Dec. 15.

IRONWORK FOR RETORT-HOUSE.
BURY GAS DEPARTMENT. Tenders by Dec. 13.

MAINS AND CONNECTIONS.
TEIGNMOUTH GAS DEPARTMENT. Tenders by Jan. 6.

PURIFIERS.
BANGOR GAS DEPARTMENT. Tenders by Dec. 15.

RETORT BENCH AND STRUCTURAL ALTERATIONS.
TEIGNMOUTH GAS DEPARTMENT. Tenders by Jan. 6.

RETORT-HOUSE FLOOR, &c.
WALLASEY GAS DEPARTMENT. Tenders by Dec. 18.

RETORTS.
LEICESTER GAS DEPARTMENT. Tenders by Dec. 6.

SCRUBBER-WASHER (Holmes) AND LIVESEY SCRUBBER.
TEIGNMOUTH GAS DEPARTMENT. Tenders by Jan. 6.

TAR.
SHOTLEY BRIDGE GAS COMPANY. Tenders by Dec. 10.

TAR-EXTRACTOR AND SCRUBBER-WASHER.
WALLASEY GAS DEPARTMENT. Tenders by Dec. 18.

NOTICES TO CORRESPONDENTS, ADVERTISERS, AND SUBSCRIBERS.

No notice can be taken of anonymous communications. Whatever is intended for insertion in the "JOURNAL" must be authenticated by the name and address of the writer; not necessarily for publication, but as a proof of good faith.

COPY FOR ADVERTISEMENTS for the "JOURNAL" should be received at the Office NOT LATER than TWELVE O'CLOCK NOON ON MONDAY, to ensure insertion in the following day's issue.

Orders for Alterations in, or Stoppages of, PERMANENT ADVERTISEMENTS should be received by the FIRST POST on SATURDAY.

Wanted, For Sale, and Tender Advertisements, Six Lines and under 3s.; each additional Line, 6d.

TERMS OF SUBSCRIPTION to the "JOURNAL."

One Year, 21s.; Half Year, 10s. 6d.; Quarter, 6s. 6d.
Payable in Advance. If credit is taken, the charge is 25s. a year.

All Communications, Remittances, &c., to be addressed to WALTER KING, 11, BOLT COURT, FLEET STREET, LONDON, E.C.
Telegrams: "GASKING, LONDON." Telephone: P.O. 1371a Central.

GAS PURIFICATION AND CHEMICAL COMPANY, LIMITED.

OXIDE OF IRON.

O'NEILL'S Oxide has a larger annual sale than all other Oxides combined. Purity and uniformity of quality guaranteed.
JOHN WM. O'NEILL, Managing Director,
160, 161, & 162, PALMERSTON HOUSE,
OLD BROAD STREET,
LONDON, E.C.
ANDREW STEPHENSON, AGENT. All communications RE OXIDE to the COMPANY as above.

WINKELMANN'S
"VOLCANIC" FIRE CEMENT.
Resists 4500° Fahr. Best for GAS-WORKS.
ANDREW STEPHENSON, 182, Palmerston House, Old Broad Street, London, E.C. "Volcanism, London."

TO GAS AND WATER OFFICIALS.
HIGH CLASS CYCLES at lowest Prices guaranteed and sent on APPROVAL for Cash or GRADUAL PAYMENTS. Catalogue and Testimonials from Gas Managers post free.
MELROSE CYCLE COMPANY, COVENTRY.

J. & J. BRADDOCK (Branch of Meters Limited), Globe Meter Works, OLDHAM, and 45 & 47, Westminster Bridge Road, LONDON, S.E.
First-Class Award, Melbourne Exhibition, 1889, for WET AND DRY GAS-METERS, STATION METERS, AND GOVERNORS, PRESSURE-GAUGES, STREET LAMPS AND PILLARS, &c.
Telegraphic Addresses:
"Braddock, Oldham." "Metrique, London."

DUTCH OXIDE OF IRON.

EERSTE Hollandsche Yzererts Maaty
(First Dutch Bog Ore Company, Ltd.), ROTTERDAM.
General Manager (for England and Wales)—
CHARLES E. FRY, LEAMINGTON; and at Tower Chambers, Brown Street, MANCHESTER.
London Managers—
E. PADFIELD & CO., 96-98, Leadenhall Street, LONDON, E.C.
General Manager (for Scotland)—
J. B. MACDERMOTT, 11, Bothwell St., GLASGOW.

SPECIAL PAINT FOR GAS-WORKS.
JOHN E. WILLIAMS AND CO.,
VICTORIA PAINT WORKS,
MANCHESTER.
Telegrams: "ENAMEL." National Telephone 1759.

COAL GAS TAR wanted.
Gas Managers in Gloucester, Somerset, Worcester, Devon, Wilts, Hereford, Monmouth, and Glamorgan PLEASE NOTE. BEST PRICE offered, either on Fixed or Sliding-Scale Basis.
State Quantity to offer for Prompt and Forward Delivery.
The SHARPNESS CHEMICAL COMPANY, Tar Distillers, Sharpness Docks, GLOS.

OXIDE OF IRON.
FIRE Cement, Paint, Mains, Tubes,
STREET LANTERNS, GLASS, TOOLS, &c.
BALE & CHURCH,
5, CROOKED LANE, CANNON STREET,
LONDON, E.C.

BROTHERTON & CO., LIMITED.
Offices: Commercial Buildings, LEEDS.
Correspondence invited.

JOHN RILEY & SONS, Chemical Manu- facturers, Hapton, near Accrington, are MAKERS of Special SULPHURIC ACID, for Sulphate of Ammonia Making. Highest percentage of Sulphate of Ammonia obtained from the use of this Vitriol. References given to Gas Companies.

GAS TAR wanted.
BROTHERTON AND Co., LTD., Tar Distillers. Works: BIRMINGHAM, LEEDS, and WAKEFIELD.

STREET AND SHOP LAMPS AND LANTERNS.
MARK DUFFIELD & SONS (Established 200 Years), makers of Street and Shop Lamps to own Pattern and Design. Any description of Lamp made. Inquiries invited.
London Manager: EDWARD PADFIELD, West India House, 96 & 98, LEADENHALL STREET, E.C.
Telegraphic Address: "EUPATHY, LONDON."

SULPHURIC ACID for Sale.
BROTHERTON AND Co., LTD., Chemical Manufacturers. Works: BIRMINGHAM, LEEDS, and WAKEFIELD.

IT is worth your while to buy direct.
THE RELIANCE LUBRICATING OIL COMPANY 19 and 20, Water Lane, Great Tower Street, London, E.C., handle all kinds of Lubricating Oils, for Engines, Cylinders, Dynamos, Spindles, &c., Burning Oils, Solar Distillates, Carburetting Oils, and Spirits for Gas Making; Motor Oils, Fuel Oils, Animal, Fish, and Vegetable Oils, &c., for all purposes. Write for our "Trade Mark" Inkstand, sent free to customers. Non-customers, 2s. 6d. each. RELIANCE LUBRICATING OIL COMPANY, London, Glasgow, Newcastle-on-Tyne, &c. Established 1858. Telegraphic Address: "Subastral," London; A.B.C. Code used. Telephone No.: Avenue 5891.

AMMONIACAL LIQUOR wanted.
BROTHERTON AND Co., LTD., Ammonia Distillers. Works: BIRMINGHAM, LEEDS, and WAKEFIELD.

PATENTS AND TRADE MARKS
PUBLICATIONS. "MERCHANDISE MARKS ACT, and Decisions thereunder," 1s.; "TRADE SECRETS v. PATENTS," 6d.; "DOCTRINE of EQUIVALENTS, Mechanical and Chemical," 6d.; "SUBJECT-MATTER of PATENTS," 6d.
MEWBURN, ELLIS, & PRYOR, Chartered Patent Agents, 70 and 72, Chancery Lane, London, W.C. Telegrams: "Patent London." Telephone: No. 243 Holborn.

HYDRATED OXIDE OF IRON.
PREPARED from Pure Iron.
Twice as Rich as Bog Ore.
Gives no Back Pressure.
The Cheapest in the Market.
Can be Lent on Hire.
Can be Exchanged for Spent Oxide.
READ HOLLIDAY AND SONS, LTD., HUDDERSFIELD.

PENNY-IN-THE-SLOT WORK.
H. GREENE & SONS, Ltd., are prepared to give QUOTATIONS to Gas Companies or Corporations for FITTING UP COMPLETE and CARRYING OUT the WORK in its entirety, either in Iron or Compo.
19, FARRINGDON ROAD, LONDON, E.C.
Telegrams: "LUMINOSITY."

SULPHATE OF AMMONIA
SATURATORS and LEAD WORK for Sulphate of Ammonia Plants.
For REPAIRS or ALTERATIONS, ring up "0848 BOLTON," or Telegraph "SATURATORS, BOLTON."
Largest Practice and most Up-to-Date Works in Britain.
JOSEPH TAYLOR AND Co., CENTRAL PLUMBING WORKS, BOLTON.

MR. S. J. HOWLAND, late with Messrs. John Wright and Eagle Range, Limited, desires position as TRAVELLER. Good References.
Address 55, Newton Road, FAVERSHAM.

AGENT Wanted, by German Works, for the sale in the United Kingdom of WATER-METERS, HYDRAULIC BLOWERS, WATER-PRESSURE INDICATORS, and other Appliances. A well-introduced Civil Engineer preferred.
Apply, by letter, to No. 3939, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

TO MANUFACTURERS OF GAS APPLIANCES.
A GENTLEMAN with many years' connection with Metropolitan and Suburban Gas Companies, is prepared to REPRESENT, on Commission, a limited number of firms of standing for the Sale of Gas Apparatus.
Address No. 3952, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

MAIN and Service Layer (good) wanted. Permanency to suitable Man.
State Age, Wages required, and enclosing *copies* of Testimonials, to ALBERT E. LAYTON, Manager, Gas-Works, REDDITCH.

BARKING GAS COMPANY.
ASSISTANT Wanted at Once. A Man with thorough practical knowledge of the whole routine of Gas Manufacture, also Sulphate of Ammonia, and able to take entire charge of the Works.
Further Particulars can be had on application.
Apply, stating Age, Salary expected, Experience, and when at Liberty, to W. B. REIDIE, Gas-Works, BARKING.

ILFORD GAS COMPANY.
SHOW-ROOM ATTENDANT AND CLERK.
WANTED, a Man not under 20, used to the business, to act as above, and to receive payment of Accounts.
Apply, stating Age, Experience, Salary required, and when able to commence Duties, to the SECRETARY, Ilford Gas Company, Cranbrook Road, ILFORD.

REMUNERATIVE Novelty in Street-LAMPS, for Gentlemen calling regularly on Gas Companies. Good Commission.
For Particulars apply to C. LANG, 554, LEADENHALL HOUSE, E.C.

REQUIRED, a Gentleman of Ability, with first-class References and Experience in the Gas-Fittings, Accessory, and Allied Trades, to manage an established and prosperous business in Wellington, New Zealand. Good Salary.
Apply to C. LANG, 554, LEADENHALL HOUSE, E.C.

WASTE Inspector wanted immediately.
Age 30 to 40. Must thoroughly understand, and be able to carry out, the Deacon System of Waste Prevention. A practical Plumber preferred.
Application, stating Age, Qualifications, Experience, and Wages required, to be made, by letter only, marked "Waste Inspector," to the SECRETARY, Sutton District Water Company, Sutton, SURREY.

WANTED, a well-educated Young Man for general Office Work. Previous Experience indispensable. Age not under 20.
Applications, stating Age, Experience, and Salary required, with *copies* only of Three recent Testimonials, to be sent in before Dec. 1, to J. H. BROWN, Engineer and Manager, Gas-Works, Ilford, ESSEX.

WANTED, an experienced Draughts-man, capable of taking entire charge of Drawing Office. Must have thorough knowledge of Coal and Coke Elevating and Conveying Plant of all descriptions. Must also be efficient in Retort-House and Gas-Works Plant in general. Commencing Salary £250 per annum.
Apply to GIBBONS BROS., LTD., DUDLEY.

WANTED, a thorough Draughtsman, for a Gas Company near London, capable of Taking out Quantities, Making Estimates, and well acquainted with all kinds of modern apparatus for the Manufacture and Purification of Coal and Oil Gas.
Apply, by letter, stating Age and Salary required, and also give an account of previous training, No. 3951, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, for a large Gas-Works in the South of England, a GENERAL FOREMAN, who will also be required to take full charge of the Works in the absence of the Engineer. Wages, £2 per week, with a Cottage on the Works, Coal, and Gas, &c.
Applications, stating Age, Qualifications, and present position, are to be sent, with References, to No. 3954, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, by a Gas Company in the North of England (population 150,000), a smart, active, intelligent Man, who has had experience in Prepayment Meter Installation, Mantle Maintenance, and canvassing for Consumers.
Applications, with not more than three recent Testimonials, stating Age, Experience, and Salary required, to be sent (by post) before Dec. 14, to No. 3950, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

GAS Manager and Engineer wanted for Peru. Age limit 40. Must have thorough practical acquaintance with all branches of Gas Manufacture and Distribution. Term of engagement, Three to Five Years. Salary to commence £350, rising £50 per annum to maximum £500, with a percentage of Net Profits in addition. Also unfurnished House, Water, Coals, and Gas free.
Write, with *copies* of Testimonials, to "PERU," care of Lee and Nightingale, LIVERPOOL. Candidates in Scotland may obtain further Information, if desired, by also communicating by letter with Mr. Peter Innes, 11, Bothwell Street, Glasgow.

SEVENOAKS WATER-WORKS COMPANY.
WANTED, by the above Company, a reliable Man, not over Forty Years of age, to superintend the work of Extension to an outlying District, which will include Pumping-Station, Reservoir, and Mains, at a total cost of about £8000.
Apply, by letter only, in first instance, giving full Particulars as to experience in Water-Works practice, with Reference, and state if accustomed to good work.
FRED HUNTER,
Manager.
Water-Works Office, Oak Lane,
Sevenoaks, Nov. 27, 1902.

FOR SALE—Ten Gas-Meter Company, Limited, £10 SHARES.
Apply, by letter, to No. 3956, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

STATION METER.
FOR SALE - 5000 cubic feet per hour STATION METER, with Valves and Connections.
Further Particulars may be had on application to HERBERT LEES, Gas Office, HEXHAM.

TO BE SOLD—Gasholder, Two Lifts, with Five Columns, 43,000 feet capacity, which can be increased to 49,000 feet if preferred.
WANTED—TANK and GASHOLDER, 20,000 to 25,000 feet capacity.
Write J. WRIGHT, 181, QUEEN VICTORIA STREET, E.C.

GAS PLANT for Sale—I can always offer NEW and SECOND-HAND GAS APPARATUS, including Retorts and Fittings, Condensers, Exhausters, Scrubbers, Washers, Purifiers, Gasholders, Tanks, Valves, Connections, &c. Also a few COMPLETE WORKS. Compare Prices and Particulars before ordering elsewhere.
J. F. BLAKELEY, Gas Engineer, Thornhill, DEWSBURY.

FOR SALE—Fifty £1 Ordinary Shares in Messrs. C. & W. Walker, Ltd.
Apply, by letter, to No. 3955, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

FOR SALE—A Quantity of Black and GALVANIZED TUBE FITTINGS. Best makers. Originally ordered in error. Full List and Particulars on application.
Address No. 3953, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

QUANTITY of Good Relayable Flange and Bull-Head RAILS FOR DISPOSAL, suitable for Sidings. Also TURNTABLES, CHAIRS, SLEEPERS, POINTS and CROSSINGS, PORTABLE RAILWAY and WAGGONS.
Apply to JOHN BEATSON & SON, 6, The Strand, DERBY.

EDINBURGH AND LEITH CORPORATIONS' GAS COMMISSIONERS.
DISUSED GAS PLANT.
THE Commissioners have for Disposal the whole of their GAS-WORKS PLANT formerly comprising the Leith Gas-Works, consisting of RETORT and FURNACE FITTINGS, HYDRAULIC MAINS, BUCKSTAYS, FLOOR PLATES, ANNULAR and TUBULAR CONDENSERS, DONKIN'S STEAM-ENGINES and EXHAUSTERS, ROTARY WASHER-SCRUBBERS, PURIFIERS and COVERS of various sizes, &c., &c., &c.
Permits to View, and Quotations for all or sundry parts of the Plant, to be addressed to Mr. W. R. HERRING, Gas-Works, New Street, EDINBURGH.

URBAN COUNTY DISTRICT OF BANGOR, CO. DOWN.
THE Council of the above District invite TENDERS for supplying and fixing three new PURIFIERS, each 12 ft. by 12 ft. by 5 ft. deep, at their Gas-Works, Bangor.
They also invite TENDERS for supplying and fixing three SECOND-HAND PURIFIERS, in good condition, of the same dimensions. In the latter case, persons tendering to state how long in use, and reason for disposal.
Further Particulars can be had on application to the Gas Manager, Bangor, Co. Down.
Tenders will be received by me up till Twelve o'clock noon, on Monday, the 15th of December next.
The Council do not bind themselves to accept the lowest or any Tender.
JAMES MILLIKEN,
Clerk to the Council.
Town Hall, Bangor,
Co. Down, Nov. 21, 1902.

SOUTHWARK AND VAUXHALL WATER COMPANY.
TO COAL MERCHANTS.
THE Directors invite Tenders for the supply, at their several Stations, of about 30,000 Tons (more or less) of COAL during the Year 1903.
Specification and Form of Tender may be obtained at the Office of the Engineer, upon payment of 10s. 6d., which amount will be refunded on receipt of a *bond-fide* Tender.
The latter must be sent in not later than Monday, the 8th of December, 1902, addressed to the Chairman, Southwark and Vauxhall Water Company, Southwark Bridge Road, London, S.E., endorsed "Tender for Coal."
The Directors do not bind themselves to accept the lowest or any Tender.
J. W. RESTLER,
Engineer.
Southwark and Vauxhall Water Company,
Southwark Bridge Road, London, S.E.,
Nov. 25, 1902.

ASHFORD (KENT) URBAN DISTRICT COUNCIL.
(GAS DEPARTMENT.)
THE Lighting Committee of the above Council have FOR DISPOSAL the under-mentioned GAS PLANT recently put out of use in consequence of enlargements.
One SCRUBBER, 30 feet high by 5 feet diameter, with Tippler House, 10-inch Connections, Three 10-inch VALVES, LADDER, GRIDS, &c.
One TAR EXTRACTOR (Washer), 5 feet square, with overflow, 10-inch Connections, Three 10-inch VALVES, &c.
One 10-inch CENTRE VALVE and CONNECTIONS for four Purifiers.
All the above are of Messrs. C. & W. Walker's make (1887), and in good condition.
Two EXHAUSTERS (Rotary), 15,000 cubic feet per hour—one being Donkin's make, two Blades, and one Waller's make, three Blades, with four 6-inch Valves, one 6-inch Bye-Pass Valve and Connections, 10-inch and 6-inch.
Two Egg-end BOILERS, 9 ft. by 3 ft., with Fittings complete.
One dished-end BOILER, 9 ft. by 4 ft.
One 6-inch Four-Way HYDRAULIC VALVE.
One TRAVELLING LIFT for 12 feet Purifier Lids.
One " 8 " "
Four pieces of STEEL "HYDRAULIC MAIN," 16 in. by 16 in., 36 feet total length.
Twenty-eight feet of TURNED SHAFTING, 2⅞ inches and 2¾ inches.
Twelve PULLEY-WHEELS (various sizes), two pair COUPLINGS.
Nine PLUMMER BLOCKS and CARRIAGES, two 3-inch FORCE PUMPS, NAVY PUMP, and sundry CONNECTIONS, PIPES, SCRAP, CAST, and WROUGHT IRON.
Tenders for all or sundry part of the above will be received by the Committee on or until Friday, Dec. 12, 1902, and must be addressed J. Morton, Gas-Works, Ashford, Kent, endorsed "Tenders for Materials."
By order,
G. HARPER,
Chairman.
Nov. 25, 1902.

SHREWSBURY GASLIGHT COMPANY.

MORTGAGE BONDS.

THE Directors are prepared to accept sums of £100, or multiples thereof, on MORTGAGE BOND, specially secured by Act of Parliament upon the Company's Property and Revenues, at £3 10s. per cent. per annum, repayable at the end of one year, or afterwards subject to Six Months' Notice on either side. Other periods may be arranged to suit lenders.

Interest payable half yearly, at Lady-day and Michaelmas.

Apply to the SECRETARY,
Gas Offices,
Shrewsbury.

Nov. 1, 1902.

CORPORATION OF LEICESTER.

RETORTS AND FIRE-BRICKS.

THE Gas and Electric Lighting Committee of the above Corporation are prepared to receive TENDERS for the supply and delivery of RETORTS and FIRE-BRICKS.

Specifications, Quantities, and Form of Tender can be obtained on application to the Engineer.

Tenders, addressed to Mr. Councillor Edwards, Chairman, and endorsed "Tender for Retorts, &c.," to be delivered at these Offices not later than Eleven o'clock a.m., on Saturday, the 6th of December, 1902.

The Committee do not bind themselves to accept the lowest or any Tender.

ALFRED COLSON,
M.Inst.C.E., M.Inst.E E.,
Engineer and Manager.

Gas Offices, Millstone Lane,
Leicester, Nov. 26, 1902.

URBAN DISTRICT COUNCIL OF ABERTILLERY.

THE above Council invite Tenders for adding a SECOND LIFT to their present SINGLE-LIFT HOLDER at their Gas-Works, Abertillery.

The Holder is 75 feet in diameter by 20 feet in depth, and is already cupped to receive the second lift.

Parties tendering are to communicate with the Council's Manager (Mr. M'Bean), who will point out the existing Holder, and give all necessary Information.

Sealed Tenders, accompanied by detailed Plans and Specifications, addressed to me at No. 1, King Street, Abertillery, and endorsed "Holder Extension," to be delivered not later than Twelve Noon of the 15th of December, 1902.

The lowest or any Tender not necessarily accepted.

The Contractor whose Tender is accepted will, at his expense, have to enter into a Contract and Bond, with suitable sureties, for the due performance of the Contract.

JNO. ALEX. SHEPARD,
Clerk to the Council.

Abertillery, Mon., Nov. 24, 1902.

URBAN DISTRICT COUNCIL OF TEIGNMOUTH.

TENDERS are invited for the following EXTENSIONS and ALTERATIONS at the Gas-Works:—

1.—A new RETORT-BENCH of Shallow Regenerators.
2.—STRUCTURAL ALTERATIONS to RETORT-HOUSE.
3.—DUPLICATION of EXHAUSTING PLANT.
4.—A new ENGINE and EXHAUSTER-HOUSE.
5.—A new HOLMES SCRUBBER-WASHER, and LIVESEY WASHER.
6.—All new MAINS and CONNECTIONS required in the re-arrangement of Plant.

The Plans may be seen, and a copy of Specification, General Conditions, and Form of Tender obtained, on application to Mr. J. Alex. Gray, Gas Engineer, Teignmouth.

A Payment of One Guinea will be required for a copy of the Specification, which will be returned on receipt of a *bonâ-fide* Tender.

Sealed Tenders, endorsed "Gas-Works' Extensions," to be delivered at the Clerk's Office, Town Hall, Teignmouth, at any time previous to Ten a.m. of Tuesday, the 6th day of January, 1903.

A. PERCIVAL DELL,
Clerk to the Council.

Town Hall, Teignmouth,
Nov. 25, 1902.

WALLASEY URBAN DISTRICT COUNCIL.

(GAS, WATER, AND ELECTRICITY DEPARTMENT.)

GAS-WORKS EXTENSIONS.

THE Wallasey Urban District Council are prepared to receive TENDERS for the whole or any portion of the under-mentioned works, viz.:—

(*a*) RETORT-HOUSE FLOOR and FITTINGS.
(*b*) ANNULAR CONDENSERS.
(*c*) EXHAUSTER and ENGINE.
(*d*) TAR-EXTRACTOR & ROTARY SCRUBBER-WASHER.

Copies of the Specification, together with any further Information, may be obtained on application to the Engineer and Manager, Mr. J. H. Crowther, at his Office, Great Float, near Birkenhead.

A charge of One Guinea will be made for a copy of each Specification, to be returned on receipt by the Council of a *bonâ-fide* Tender.

Sealed Tenders, on the form embodied in the Specification, endorsed "Tender for Retort-House Floor" (or any other section as the case may be), and addressed to the undersigned, to be delivered, per post, at my Office, as below, not later than the morning of Thursday, the 18th of December, 1902.

The Contractor or Contractors (as the case may be), will be required to enter into a Bond with approved Sureties for the due completion of the respective Contracts.

The Council do not bind themselves to accept the lowest or any Tender.

By order,
H. W. COOK,
Clerk and Solicitor.

Public Offices: Egremont,
Cheshire, Nov. 18, 1902.

SHOTLEY BRIDGE AND CONSETT DISTRICT GAS COMPANY.

THE Directors of this Company are prepared to receive TENDERS for the purchase of the whole of the TAR to be produced at their Works during the Year 1903. Probable quantity from 60,000 to 70,000 gallons.

Contractor will be required to find his own Casks for the removal of the Tar, and to accept delivery at N. E. Railway Station, Blackhill.

Tenders to be sent to the undersigned not later than Wednesday, Dec. 10, 1902.

M. RICHLEY,
Secretary.

Nov. 27, 1902.

COUNTY BOROUGH OF BURY.

GAS-WORKS EXTENSIONS.

THE Gas Committee invite Tenders for:—

CONTRACT No. 1—BRICKWORK for the Walls, Arches, and Chimneys for Six through Beds of Retorts.
CONTRACT No. 2—IRONWORK for ditto, with Stage Flooring.
CONTRACT No. 3—COKE STORAGE HOPPERS.

The Plans can be seen, and Specification, General Conditions, and prescribed Form of Tender obtained, on application to the Engineer and General Manager, Mr. H. Simmonds, Gas-Works, Elton, upon the payment of 10s. 6d. for each Contract, which will be returned when a *bonâ-fide* Tender has been delivered.

Tenders to be delivered at the offices of the undersigned, addressed to the Chairman of the Gas Committee, endorsed "Tender for Contract No. 1, 2, & 3," on or before the 13th day of December next.

JOHN HASLAM,
Town Clerk.

Corporation Offices, Bank Street,
Bury, Nov. 20, 1902.

THE GASLIGHT AND COKE COMPANY.

NOTICE is Hereby Given, that the TRANSFER BOOKS of this Company, so far as they relate to DEBENTURE STOCK and BONDS, WILL BE CLOSED at Four o'clock p.m. on Wednesday, the 10th prox., for the Half Year ending on the 31st prox., and WILL BE RE-OPENED on the morning of Thursday, the 11th prox.

The Interest for the Half Year will be payable on the 1st of January next to the Proprietors registered on the closing of the Books.

By order,
JOHN WILLIAM FIELD,
Secretary and General Manager.

Chief Office: Horseferry Road,
Westminster, S.W., Nov. 28, 1902.

HORNSEY GAS COMPANY.

NOTICE is Hereby Given, that an EXTRAORDINARY GENERAL MEETING of the Proprietors of the above-named Company will be held at the Offices of the Company, No. 63, Chancery Lane, in the county of London, on Friday, the 19th day of December, 1902, at 3.30 o'clock in the afternoon precisely, when the following RESOLUTION will be submitted to the Meeting, viz.:—

"That the Directors be, and they are hereby authorized, in pursuance of the powers contained in, and in the manner prescribed by, the 'Hornsey Gas Order, 1902,' and the several Acts of Parliament incorporated therewith, to create Additional Capital to the extent of £50,000, to be issued at such times, of such amounts, of such denominations, and subject to such conditions of sale and provisions, within the powers of the said Acts, as the Directors may from time to time determine."

Dated this 21st day of November, 1902.

By order of the Board,
WILLIAM E. ROBERTS,
Secretary.

CONTINENTAL UNION GAS COMPANY, LTD.

NOTICE is Hereby Given, that the ORDINARY GENERAL MEETING of the Proprietors will be held at the Offices of the Company, 7, Drapers' Gardens, Throgmorton Street, E.C., on Tuesday, the 9th of December, at Two o'clock precisely, to receive the Directors' Report, a Statement of Accounts, and for Declaration of a Dividend.

The retiring Director is J. Horsley Palmer, Esq., and the retiring Auditors are A. T. Eastman, Esq., and C. P. Crookenden, Esq. All being eligible for re-election, offer themselves accordingly.

The Accounts will be open for the inspection of the Proprietors at the Offices of the Company on and after Thursday, the 4th of December.

By order of the Board,
F. W. HIMING,
Secretary.

7, Drapers' Gardens, Throgmorton Street,
London, E.C., Nov. 27, 1902.

N.B.—The TRANSFER BOOKS WILL BE CLOSED from Tuesday, the 2nd of December, to Tuesday, the 16th of December, both days inclusive.

NEWPORT (MON.) GAS COMPANY.

SALE BY TENDER OF £20,000 CONSOLIDATED STOCK.

IN PURSUANCE OF THE NEWPORT (MONMOUTHSHIRE) GAS ACT, 1900.

THE Directors invite Tenders for £20,000 of CONSOLIDATED STOCK of the Company, in Lots of £100 each, such Stock to bear a Maximum Dividend of £5 per cent. per annum, and to be paid up in full on or before the 31st day of December, 1902.

Particulars and Conditions, with Form of Tender, may be obtained on application to this Office, and sealed Tenders must be sent in not later than Ten o'clock a.m. on Friday, the 12th day of December, 1902.

By order,
T. H. HAZELL,
Secretary.

Gas Offices, Newport (Mon.),
Nov. 21, 1902.

GRAND JUNCTION WATER-WORKS COMPANY.

NOTICE is Hereby Given, that the ORDINARY HALF-YEARLY GENERAL ASSEMBLY of the Grand Junction Water-Works Company will be held at the Company's Offices, 63, South Molton Street, London, W., on Wednesday, the 10th day of December, 1902, for the General Business of the Company.

The chair will be taken at Twelve o'clock noon precisely.

By order,
J. GOODWIN,
Secretary.

Pursuant to Act of Parliament, the Company's TRANSFER BOOKS WILL BE CLOSED on Wednesday, the 26th day of November, and will be RE-OPENED on Thursday, the 11th day of December, 1902.

NOTICE is Hereby Given, that the HALF YEARLY GENERAL MEETING of the Governor and Company of Chelsea Water-Works will be held at their Office, Commercial Road, Pimlico, in the County of London, on Thursday, the 18th day of December prox., at one o'clock in the afternoon precisely, for the General Business of the Company.

The REGISTER OF TRANSFERS WILL BE CLOSED between the 6th Day of December prox. and the 18th day of December prox., both days inclusive.

By order,
G. H. GILL,
Secretary.

London, Nov. 22, 1902.

ISSUES BY AUCTION OF GAS AND WATER STOCKS AND SHARES.

MR. ALFRED RICHARDS begs to notify that his ISSUES by AUCTION under PARLIAMENTARY POWERS of STOCKS and SHARES in LONDON, SUBURBAN, and PROVINCIAL GAS and WATER COMPANIES take place PERIODICALLY at the Mart, TOKENHOUSE YARD, E.C.

Terms for Issuing such Capital, and also for including Gas and Water Stocks and Shares belonging to Private Owners in these Periodical Sales, can be obtained on application at Mr. ALFRED RICHARDS' OFFICES, 18, FINSBURY CIRCUS, E.C.

GREAT YARMOUTH WATER-WORKS COMPANY.

SALE BY AUCTION OF 500 £10 ORDINARY SHARES,

Ranking for Seven per Cent. Dividend—Four per Cent. having been paid on similar Shares in the Company for six years' past.

The Great Yarmouth Water-Works Company was Incorporated nearly fifty years ago, for supplying the important seaport town of GREAT YARMOUTH and its surrounding districts; and to keep pace with the increasing demand for Water, this further Capital for the construction of new Works is required.

The Water Revenue has risen from £14,226 in 1897 to £17,765 last year.

MR. ALFRED RICHARDS will SELL the above by AUCTION at the MART, LONDON, E.C., on TUESDAY, DEC. 9, at Two o'clock, in Lots, by order of the Directors.

Particulars of Sale, with Form of Instructions for the Auctioneer or Secretary to purchase for Investors unable to attend the Auction, obtainable, post free, of the SECRETARY OF THE COMPANY, GREAT YARMOUTH, or of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

By order of the Directors of the

SOUTH ESSEX WATER-WORKS COMPANY.

NEW ISSUE OF £2500 FOUR PER CENT. PERPETUAL DEBENTURE STOCK.

MR. ALFRED RICHARDS will Sell the ABOVE BY AUCTION, at the Mart, E.C., on Tuesday, the 9th of December, at Two o'clock precisely, in Lots.

Particulars of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

Second Sale, Water Order, 1902.

BOROUGH OF PORTSMOUTH WATER-WORKS COMPANY.

IMPORTANT SALE OF NEW ISSUE OF SHARES
IN THIS OLD-ESTABLISHED AND GOOD DIVIDEND PAYING COMPANY.

C. B. SMITH, SAPP, & WYATT are favoured with instructions from the Directors of the above Company to SELL by PUBLIC AUCTION, at the Lower Albert Hall, Commercial Road, Portsmouth, on Thursday, December 11, 1902, at Seven o'clock in the Evening (in convenient Lots), the second portion of the New Issue authorized under the Borough of Portsmouth Water Order, 1902, consisting of—

2000 SHARES OF £5 EACH
(Fully paid), forming part of the new Ordinary Capital authorized under such Order.

The Auctioneers desire to call the special attention of Capitalists, Investors, and Others to this very favourable opportunity of securing Shares in such a thoroughly sound Local Company.

The Shares will be sold *free of any Charges*, Fees, or Expenses whatever to the Purchaser.

Full Particulars and Conditions of Sale may be obtained, with any further Information, from the Secretary of the Company, J. L. WILKINSON, Esq., F.I.S., at the Company's Offices, Commercial Road, PORTSMOUTH; or of the AUCTIONEERS, at their Offices, Pearl Buildings, PORTSMOUTH.

Telephone No. 69.